The Effect of Trainer Muscularity and Expertise on Self-Presentational Concerns, Body Image, and Performance in College Men during One-Repetition Maximum Testing

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ABSTRACT

This study attempted to manipulate self-presentational efficacy to examine the effect on social anxiety, social physique anxiety, drive for muscularity, and maximal strength performance during a one-repetition maximum (1-RM) chest press and leg press test. Ninety-nine college men with a minimum of six months of previous weight training experience were randomly assigned to complete a 1-RM protocol with either a muscular male trainer described as an expert or a lean male trainer described as a novice. Participants completed measures of self-presentation and body image prior to meeting their respective trainer, and following the completion of the 1-RM tests. Although the self-presentational efficacy manipulation was not successful, the trainers were perceived significantly differently on musculature and expertise. The group with the muscular, expert trainer reported higher social anxiety and attained higher 1-RM scores for the chest and leg press. Thus, trainer characteristics can affect strength performance and self-presentational concerns in this population.

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CHAPTER ONE: LITERATURE REVIEW

1.1 *Strength Training*

Strength training is a form of physical activity intended to increase muscular strength and mass. Strength is defined as the maximal force that a specific muscle or muscle group can generate at a specified velocity (Baechle & Earle, 2008). Strength training, otherwise known as resistance training, promotes microscopic tears within the muscle fibers, and the rebuilding process increases the overall size and capacity of the fibers and the muscle as a whole. This process takes approximately 24 to 48 hours for maximal recovery depending on the function and structure of the muscles involved (Donatelle, Davis, Munroe, Munroe, & Casselman, 2003). Individuals who engage in consistent strength training are less likely to experience loss of muscle mass, functional decline, and fall-related injuries than adults who do not strength train (Butler, Norton, Lee-Joe, & Coggan, 1998; Chandler, Duncan, Kochersberger, & Studenski, 1998; Seguin & Nelson, 2003). Muscular strength is a core component of overall health along with cardiovascular endurance, balance and flexibility, and is capable of providing several physiological benefits (Humphries, Duncan, & Mummery, 2010).

1.1.1 ***Importance and Prevalence of Strength Training.*** Regular exercise has demonstrated improvements in over 50 aspects of human life including psychological, metabolic and physiological adaptations (Donatelle et al., 2003; Warburton, Nicol, & Bredin, 2006). In addition to these health benefits, physical activity may also slow declines in muscular strength, cardiovascular endurance, as well as balance and flexibility associated with aging (Humphries et al., 2010). Strength training has been shown to improve muscular strength and endurance, strengthen the bones, control blood pressure,

lower low-density lipoprotein (LDL) and raise high-density lipoprotein (HDL) cholesterol, and improve body composition while assisting in maintaining a healthy weight and enhancing heart-lung function (Winett & Carpinelli, 2002). It has also been associated with improvements in several metabolic disorders (Jurca et al., 2005), as well as reducing the risk of health complications such as cancer, obesity, cardiovascular disease, hypertension, osteoporosis, and Type 2 diabetes mellitus (Warburton et al., 2006). In addition to the innumerable physiological benefits of resistance training, there are also psychological benefits associated with resistance training, such as decreases in depression, overall anxiety levels (Scully, Kremer, Meade, Graham, & Dudgeon, 1998), and a more positive self-image (Winett & Carpinelli, 2002). Overall, strength training has become an integral part of physical activity as it provides our population with physical, mental and social benefits (Canadian Society of Exercise Physiology, 2012).

While the benefits of aerobic exercise have been well-promoted by national health authorities, the endorsement of resistance training, a crucial component of physical activity, has received much less emphasis (Humphries et al., 2010). Due to the fact resistance training does not require an exceptionally developed cardiovascular system to commence, this training method is both a realistic and logical starting point in any training or weight management program (Hills et al., 2010).

When comparing the results from the 1996/1997 National Population Health Survey with those from the 2005 Canadian Community Health Survey, the proportion of Canadians who reported to be at least moderately active in their leisure time rose from 43% to 52% (Statistics Canada, 2008). Statistics Canada (2008) reported that this trend is consistent with other research showing an increase in physical activity levels since 1981.

The current popularity of physical activity and resistance training is consistently increasing with the push for a healthier culture (Canadian Fitness and Lifestyle Research Institute, 2007; Gilmour, 2007). With the increasing number of people who are strength training, it is important to examine factors that improve their experience. It is also critical to identify factors that prevent people from exercising, due to the fact the majority of the population fails to strength train despite its widely recognized benefits. With an increase in strength training and subsequent performance gains, comes an increased demand and growing popularity for maximal performance testing.

1.1.2 ***Strength Testing.*** Maximal strength testing is common in a variety of settings as a means of examining physical capabilities. Performance testing is constantly in high demand in order to monitor progress or evaluate one's potential, especially within sport. Varying methodologies exist to assess maximal strength performance. These methodologies include submaximal evaluations, or approaches that push the individual to his/her absolute threshold (Baechle & Earle, 2008). It is possible to obtain a measure of maximal strength by means of submaximal testing measures (e.g., 5-repetition maximum or 10-repetition maximum, which determine the maximum load a participant can lift 5 or 10 times respectively), as formulas can be utilized to calculate a predicted one-repetition maximum (1-RM) value based on the particular number of repetitions performed at a specific submaximal load (Brzycki, 1993). These calculations have become increasingly popular, but they yield only predicted values, and therefore exhibit a greater level of variability and inaccuracy when compared to the 1-RM test (Dohoney, Chromiak, Lemire, Abadie, & Kovacs, 2002).

1.1.3 ***Maximal Strength Testing.*** The 1-RM is defined as the greatest amount of weight that can be lifted with proper technique only one time (Baechle & Earle, 2008). This value is extremely important in training protocols to assign a training load, which is usually calculated as a percentage of the 1-RM value (Baechle & Earle, 2008).

There are multiple methods that can be used to obtain maximal strength values. Essentially, two types of strength tests have evolved: static and dynamic (Brzycki, 1993). Static (or isometric) tests are those in which a muscle exerts tension against a fixed, non-moving resistance; and dynamic (or isotonic) tests involve actual movement of one or more body parts against a resistance (Brzycki, 1993). Interfaced with a computer, some equipment is capable of measuring strength over the full range of motion while simultaneously plotting a strength curve. It is also possible to measure maximal strength by using electromyographic techniques (Heinonen et al., 1994). Each of these methods is extremely costly and time-intensive, while providing very little relevant feedback to the novel user. These methods also require specialized equipment and substantial amounts of training to effectively operate the devices and accurately interpret the data.

1.1.4 ***One-Repetition Maximum Strength Testing Protocols***. The 1-RM test is considered the "gold standard" for obtaining maximal strength values and evaluating muscular strength. It is also the most widely used approach by which the optimal intensity of training can be established to maximize response to training (Barnard, Adams, Swank, Mann, & Denny, 1999). This method is cost effective, involves limited equipment/ resources, is easy to administer, and is functional in nature with relevant, meaningful, and immediate feedback to everyone. Further, there is extensive evidence of

its validity and reliability (Shroeder, Wang, Castaneda-Sceppa, & Cloutier, 2007; Simao, Farinatti, Polito, Viveiros, & Fleck, 2007).

1.1.4.1 *Factors Influencing the Accuracy of the One-Repetition Maximum.*

Numerous factors have the potential to affect maximal strength. Although physiological characteristics (e.g., muscular size, neural factors, and muscle fiber type; Gabriel, Kamen, & Frost, 2006) are most important, there are a number of other factors that can affect maximal strength values obtained during testing. For example, the equipment used, time of day and level of fatigue all affect the level of accuracy of the 1-RM test (Merton, 1954). In addition to these considerations, psychological factors are also capable of playing a significant role in relation to strength and performance (e.g., motivation, emotion, anxiety, consequences and rewards; Grindrod, Paton, Knez, & O'Brien, 2006; Lamarche, Gammage, & Gabriel, 2011; Rhea, Landers, Alvar, & Arent, 2003). If these variables can affect maximal strength performance, it is also possible that other psychological factors may play a role in influencing maximum strength values. One such factor is self-presentational concerns.

1.2 Self-Presentation

Self-presentation or impression management is defined as an attempt by an individual to selectively present aspects of himself or herself or to omit self-relevant information to maximize the likelihood that a desired social impression will be made in others, while undesired impressions will be avoided (Carron & Prapavessis, 1997; Martin, Kliber, Kulinna, & Fahlman, 2006). People are often concerned with how others perceive and evaluate them within social settings. Parents stress to their children the importance of first impressions and how negative images will be viewed. Leary and

Kowalski (1990) stated that when parents attempt to minimize their children's public misbehaviours, they often have them consider "what the neighbours will think". Thus, from the time we are young, we learn to be concerned with what others think of us.

1.2.1 ***Why people self-present.*** There are very few social situations in which people can completely ignore the impressions being made on others, because they can affect social, psychological, and financial outcomes (Leary, 1992). It is important to note that individuals are not constantly attuned to the impressions they are making. There are different levels of impression monitoring (i.e., the extent to which we pay attention to the impressions we are making), ranging from impression oblivion (where a person is completely unaware of the impressions they are creating), to impression focus (when all of a person's thoughts involve others' impressions of him or her and the possible consequences of the impression he or she is making; Leary, 1992). Even when people are not consciously attempting to impression manage, they may continue to monitor others' reactions, often at an unconscious or pre-attentive level (Leary, 1995). In these instances, people will quickly adjust their behaviour if they believe they are forming an undesired impression (Leary & Kowalski, 1990).

Baumeister (1982) suggested that there are two primary goals for self-presentation: to please the audience and to construct one's public self to be consistent with one's ideal self. More recently, Leary (1995) further highlighted additional motives for self-presentation. One of the primary reasons people self-present is to gain rewards for being viewed positively by others while minimizing the costs of making undesirable impressions. Self-presentational failures can extend far beyond the social world, leading into materialistic and financial consequences (Leary, 1995). The way people are

perceived has the ability to affect everything from their love life to career advancement. In addition, Leary (1995) noted that we try to self-present to maintain our self-concept; that is, we try to present images congruent to how we see ourselves, to maintain consistency. Self-presentation is also used for emotion regulation, as positive impressions are generally linked to reduced negative emotions and increased positive ones (Leary, 1995).

The typical objective of self-presentation is to present an image consistent with how one perceives an audience's ideal. The goal is not to be perceived positively per se, but rather to be perceived in a desired way in order to influence other people's responses (Baumeister, 1982; Jones & Pittman, 1982; Leary, 1995). People may even present themselves negatively if they think powerful others value negative attributes, or would feel threatened by a very positive self-image, as in the case of "playing dumb" (Leary & Kowalski, 1990). Generally though, the impressions we try to make are positive, as positive impressions (such as appearing competent, skilled, or socially desirable) will increase the likelihood of one's acceptance into a social network, with additional desired rewards (Leary et al., 1994). The impressions we make ultimately affects how others treat us. As a result, self-presentation guides much of the social interaction in today's society (Hausenblas, Brewer, & Van Raalte, 2004).

1.2.2 ***Two Component Model of Self-Presentation*.** A model developed by Leary and Kowalski (1990) stated that self-presentation can be broken down into two separate components: impression motivation and impression construction. The nature of the images we try to make, and how we try to present those images is greatly affected by the target audience. This audience is capable of influencing exercise motivation,

behaviours, and affective responses (Greenleaf, McGreer, & Parham, 2006; Leary & Kowalski, 1990).

1.2.2.1 ***Impression Motivation.*** Impression motivation involves the extent to which an individual is motivated to make a specific impression, or to control his or her impressions on a particular audience (Leary & Kowalski, 1990). The degree to which people are motivated to control how others perceive them in any particular setting is affected by three situational factors. The first is the goal-relevance of impressions, as people are more motivated to impression manage when the impressions they make are relevant to their desired goals (Leary & Kowalski, 1990). The second is the value of the desired goal, as motivation typically increases when the goal becomes increasingly important and more highly desired. Lastly is the discrepancy between one's desired and current social image. Leary and Kowalski (1990) stated that people have a range of images that they regard as acceptable. When they believe that the impressions others have of them fall outside of this range, they become increasingly motivated to actively manage their impressions, in order to move back to that acceptable range.

1.2.2.2 ***Impression Construction.*** Impression construction not only involves deciding what kind of impression people desire to make, but also what approach (i.e., actions and behaviours) they will use in order to achieve this goal (e.g. by mode of self-description, actions, particular behaviours or props; Leary & Kowalski, 1990). Both dispositional and situational factors affect impression management and self-presentational concerns (Martin Ginis & Leary, 2004). Dispositional influences are trait-oriented and are typically dependent upon one's self-concept and one's beliefs about what images are desirable and undesirable. Situational factors include the perceived

values of the target/audience, along with the role constraints on the individual (Martin Ginis & Leary, 2004). In general, people choose impressions that are consistent with the values of the target, and with their current roles. Although these processes are critical to the process of self-presentation, there are other self-presentational beliefs that are also important.

1.2.3 *Specific Self-Presentational Concerns*

1.2.3.1 ***Self-Presentational Efficacy.***

Self-efficacy refers to the subjective beliefs people hold about their own capabilities to successfully meet situational demands (Bandura, 1977). The concept of self-presentation was integrated into self-efficacy theory to help understand people's self-presentationally-related behaviours and beliefs. Self-presentational efficacy refers to the belief that a person holds about whether he/she can successfully create a particular impression (Maddux, Norton, & Leary, 1988). Maddux et al. (1988) proposed self-presentational efficacy consists of three separate beliefs. The first is self-presentational outcome expectancy, which is the expectation that specific social behaviours and images will lead to desired outcomes. The second is self-presentational efficacy expectancy, which are the expectations regarding one's ability to portray a certain impression leading to a particular goal (Maddux et al., 1988). Lastly, the third component is self-presentational outcome value, which is the importance one attaches to the outcomes or goals one desires to obtain (Teasdale, 1978).

In a variety of contexts including both academic and exercise, self-presentational efficacy expectancy has consistently been the best predictor of affective and behavioural outcomes, with higher levels of all three beliefs associated with more positive outcomes (Gammage, Hall, & Martin Ginis, 2004; Maddux et al., 1988). There are two primary

factors that can influence self-presentational efficacy: (1) the assessment of the interpersonal load imposed by the social situations; and (2) the assessment of the self-presentational resources available to meet the load (Leary & Kowalski, 1995).

1.2.3.1.1 ***Factors Influencing Interpersonal Load.*** Interpersonal load refers to the demand from the situation placed on the individual, and reflects the degree to which an individual must invest attention, effort, and conscious thought to create desired impressions on others (Leary & Kowalski, 1995). Several factors can increase the load in a specific situation. Ambiguous situations, in which the "desired" impression is not clear can increase interpersonal load, as these situations do not provide specific cues for how to act (Leary, Atherton, Hill, & Hur, 1986; Leary & Kowalski, 1995). The level of uncertainty in these situations can decrease one's level of self-presentational efficacy (Leary & Kowalski, 1995). Characteristics of others can also increase interpersonal load. For example, the presence of strangers and high status individuals will tend to increase perceptions of interpersonal load (Leary, 1995). Characteristics such as high levels of knowledge, skill or expertise of a target can all increase the perceived status of a target, as these are all highly valued traits. Individuals who are more powerful or influential may also have a similar effect. Finally, level of attractiveness of others can also influence interpersonal load (Leary, 1995). We value the opinions and reactions of people with attractive characteristics more highly than those of less attractive individuals, as they are considered to have more positive qualities (e.g., warm, intelligent and socially skilled; Leary, 1992; Leary, 1995).

1.2.3.1.2 ***Factors Influencing Self-Presentational Resources.*** After individuals assess the demands of an interpersonal encounter, they will engage in a

process of self-evaluation in which they assess the probability of meeting the demands of the situation, based on available resources. Those individuals who feel they possess the characteristics or abilities to create a desired impression will have increased levels of self-presentational efficacy (Leary & Kowalski, 1995), while those who do not believe they have the resources necessary to make a desired impression will experience low self-presentational efficacy (Leary & Kowalski, 1995). For instance, individuals with higher general self-efficacy or higher self-esteem will likely assess their self-presentational resources as higher (Maddux et al., 1988). These two assessments (interpersonal load and self-presentational resources) greatly impact self-presentational efficacy (Leary & Kowalski, 1995; Maddux et al., 1988). According to Leary and Kowalski (1995), when people are motivated to create a specific impression (i.e., impression motivation), but are not sure they will be successful (i.e., low self-presentational efficacy), they will experience social anxiety.

1.2.3.2 ***Social Anxiety.*** Social anxiety is defined as anxiety resulting from the prospect or presence of personal evaluation in real or imagined situations, and occurs when individuals want to make a specific impression but are unsure they will be successful in doing so (Leary & Kowalski, 1995). Anxiety includes both a cognitive and affective response characterized by apprehension and worry about an impending and potentially negative outcome, as well as a somatic or physical response (e.g., increased heart rate, muscle tension; Marquez & McAuley, 2001; Schlenker & Leary, 1982). Virtually everybody experiences social anxiety at least occasionally, and some people experience such feelings frequently (Leary & Kowalski, 1995). In one study, over 90% of Americans indicated that they frequently felt shy (Zimbardo, 1986), and at least 2% were

so severely distressed in social encounters that their reactions could be characterized as a social phobia (Leary & Kowalski, 1995). According to Russell, Cutrona, and Jones (1986), strangers and authority figures are most likely to promote feelings of social anxiety, reported by nearly 80% of all respondents in a study describing situations involving high anxiety. Social anxiety is recognized as a prevalent and occasionally debilitating personal problem even in normal populations (Schlenker & Leary, 1982). For example, it can promote a higher level of physiological arousal, more negative evaluations and fewer positive coping cognitions (Beidel, Turner, & Dancu, 1985). Social anxiety increases as one's level of self-presentational efficacy decreases and impression motivation increases (Leary & Kowalski, 1995), while any factor that decreases self-presentational efficacy expectancy, increases self-presentational outcome expectancy, or increases self-presentational outcome value, will likely increase social anxiety (Leary et al., 1988). Leary and Kowalski (1995) identified several specific forms of social anxiety, such as public speaking anxiety, test anxiety, stage fright, and sport competition anxiety (Leary & Kowalski, 1995).

In physical activity settings, social anxiety may be quite common. For example, people may experience social anxiety with regard to their physical appearance (e.g., they are not thin or muscular enough, or they appear unattractive), their skill level (e.g., they may look uncoordinated), or their fitness level (e.g., they may appear out of shape, weak, or unfit). One specific type of social anxiety that may be particularly relevant in physical activity settings is social physique anxiety.

1.2.3.3 ***Social Physique Anxiety.*** Hart, Leary, and Rejeski (1989) first introduced the term social physique anxiety, which is a subtype of social anxiety that

occurs as a result of the prospect or presence of real or imagined evaluation of one's body by others. Social physique anxiety may be particularly important in settings where the body may be evaluated or focused upon (e.g., exercise, beach, social gathering; Martin et al., 2006). With increasing social pressures to obtain the "perfect" body and the large discrepancy between 'average' physiques and current ideals as portrayed in the media, it is not surprising both social physique anxiety and body dissatisfaction are on the rise in men (Tiggemann, Martin, & Kirkbride, 2007). Typically, the majority of research that has been done related to social physique anxiety and its effects on exercise has treated this construct as a trait (Krusselbrink, Dodge, Swanburg, & MacLeod, 2004). More recently, social physique anxiety has also been shown to have a state aspect, with levels of social physique anxiety differing across situations in the social environment. For example, Krusselbrink et al. (2004) found that women showed increasing levels of social physique anxiety from an all-female, to a mixed-sex, to an all-male imagined exercise setting. This study demonstrated that social physique anxiety can be greatly influenced by the environment. While women typically experience social physique anxiety in relation to their body weight, men are more likely to experience this form of anxiety as a result of a perception that they lack muscle mass and definition (Martin et al., 2006). As such, there is a clear link between social physique anxiety and body image.

1.3 Body Image

It is likely that many self-presentational concerns, including social physique anxiety, are related to body image (Martin Ginis, Leary, & Rejeski, 2010). Body image refers to a person's perceptions, thoughts and feelings about his/her body, and especially appearance (Cash & Pruzinsky, 1990). Body image is a significant concern throughout the lifespan,

particularly during the adolescent and young adult years (Stanford & McCabe, 2002). Further, although often considered a concern for women, it is evident that body image is also a concern for men. Cash (2002) documented that from 1972 to 1985 to 1996, the percentage of men who were dissatisfied with their "muscle tone" grew from 25 to 32 to 45%, respectively.

1.3.1 ***Body Image in Men*****.** Body image research has traditionally focused on women and the dissatisfaction resulting from the perceptions that one is overweight or not thin enough (Cafri & Thompson, 2004; Grieve, Jackson, Reece, Marklin, & Delaney, 2008; Hargreaves & Tiggemann, 2009; Peat, Peyerl, Ferraro, & Butler, 2011; Stanford & McCabe, 2002). However, there is a growing body of literature suggesting that body dissatisfaction and body image concerns among the male population is increasing, but is different in nature than that of women (Peat et al., 2011). Collectively, studies suggest that body dissatisfaction is lower among men than women, although these concerns still pose a significant problem among this particular group (Hargreaves & Tiggemann, 2009; Peat et al., 2011; Stanford & McCabe, 2002). Further, the nature of body image concerns is different for men. Men have reported the greatest dissatisfaction with their chest, weight and waist, and lack of mesomorphic structure (Scott, Joyner, Czech, Munkasy, & Todd, 2009). Researchers have suggested dissatisfaction with musculature has become a "normative discontent" for the male population just as weight dissatisfaction is highly recognized among females (Stanford & McCabe, 2002). Women tend to be concerned with being too large or heavy, while men are equally likely to want to be smaller (thinner) as bigger and more muscular (Furnham, Badmin, & Sneade, 2002; Stanford & McCabe, 2002).

There is significant pressure on males to obtain what is deemed the ideal body shape (Treasure, Lox, & Lawton, 1998). A great deal of dissatisfaction with body image in college-aged males comes from the physical pressures they place on themselves, as they consistently think women desire much more muscularity than what they actually prefer (Pope, Phillips, & Olivardia, 2000). These excessive body image concerns do not come without consequences. Body dissatisfaction commonly leads to depression, social physique anxiety, eating disorders, and reduced body esteem in men (Arbour & Martin Ginis, 2006; Leit, Gray, & Pope, 2001; Martin et al., 2006).

1.3.2 ***Ideal Male Physique.*** Research has shown that the drive for thinness is relatively rare in boys and men, and they typically desire to attain a muscular and defined stature for social power and to be seen as highly desirable by the opposite sex (McCreary & Sasse, 2000). Muscle mass and physical bulk is continuously strived for by men in modern North American culture (Mishkind, Rodin, Silberstein, & Striegel-Moore, 1986; Pope et al., 2000). The ideal build follows a V-shape with broad shoulders and a well-developed upper body, but flat stomach and narrow hips (Hargreaves & Tiggemann, 2009; Leit et al., 2001; Tiggemann et al., 2007; Mishkind et al., 1986; Scott et al., 2009; Stanford & McCabe, 2002). Men with this shape are assigned a combination of positive personality traits including being strong, happy, helpful and brave, with a sense of masculinity and energy (Franzoi & Shields, 1984; Grogan & Richards, 2002). The key aspect of the ideal body for men is a large, muscular body. This concern with muscularity has recently received a great deal of attention in the body image literature.

1.3.3 ***Drive for Muscularity.*** The drive for muscularity is a desire to be bigger and more muscular (McCreary & Sasse, 2000; Morrison, Morrison, & Hopkins, 2003). It

is common for men to desire a more muscularly developed body (Arbour & Martin Ginis, 2006). This concern stems, in part, from a variety of sociocultural sources that are consistently present within today's society. Morrison et al. (2003) stated that societal pressure emphasizes the ideal physique, which is probably unattainable for the general male population and well out of reach for the majority of obese individuals (Treasure et al., 1998). One potential explanation may be due to the media and its underlying messages. The media consistently portrays the ideal male body, which is represented by a young, lean, and muscular male (Leit et al., 2001). In a study using a set of figure body ratings ranging from very thin (with no muscle mass) to extremely large (high muscle mass), Lynch and Zellner (1999) demonstrated that 83.7% of college-aged males had the desire to be larger. Due to these consistent pressures, both men and women have internalized the notion that it is idealistic for males to be muscular (McCreary & Sasse, 2000). Overdeveloped action figures, *Men's Health* models, and *Playgirl* centerfold men have demonstrated that modern society values muscularity, viewing these individuals as the epitome of aesthetic appeal (Arbour & Martin Ginis, 2006; Leit et al., 2001; Martin et al., 2006; Pope, Olivardia, Gruber, & Borowiecki, 1999; Pope et al., 2000).

Research into perceptions of ideal body shapes reveals two very consistent findings: (a) that males will typically pick the most muscular stature as the ideal and (b) that men believe women desire muscularity in their ideal man (McCreary & Sasse, 2000). Drive for muscularity becomes an influential concept among boys in their adolescent years. It was observed that boys high in drive for muscularity had higher levels of depression and decreased self-esteem, while this correlation was not demonstrated with girls (McCreary & Sasse, 2000). Research findings also show that higher levels of the drive for

muscularity are typically associated with several adverse outcomes, including lower levels of self-esteem and life satisfaction and higher levels of depression (McCreary & Saucier, 2009). One major contributing factor to the drive for muscularity in men may be the constant comparisons between the physique of oneself and others (Major, Testa, & Bylsma, 1991).

1.3.4 ***Social Comparison.*** The majority of men have a strong desire to live up to the idealized male body, and this drive may also be affected by social comparison. Festinger's (1954) Social Comparison Theory suggests that people have an innate drive to evaluate their own abilities and characteristics. When objective comparisons are not possible, an individual may compare him or herself to another person on a particular characteristic (Festinger, 1954). When people compare themselves to someone inferior with relation to particular characteristics, a downward comparison is made, which typically is associated with an increase in self-esteem and decrease in social anxiety (Major et al., 1991). By contrast, if one compares himself to a superior individual, the opposite occurs with an upward comparison generally promoting feelings of social anxiousness (Major et al., 1991). Social comparisons occur at a young age, and by the time children become adolescents, they typically are fully aware of cultural appearance standards from peers, parents, and media (Fisher, Dunn, & Thompson, 2002). Smolak and Stein (2006) observed that adolescent boys' drive for muscularity scores were correlated positively with general social comparison tendencies. McCreary and Saucier (2009) also stated that boys' frequency of engaging in muscle building activities (i.e., a proxy for drive for muscularity) was not only positively correlated with social

comparison activities, but also positively correlated with depressive symptomology, and negatively related to body esteem.

The social comparisons people make can impact self-presentational concerns and body image. Martin Ginis, Prapavessis, and Haase (2008) found that women who believed they were less physically attractive than the fitness instructor in an exercise video reported lower self-presentational efficacy, body satisfaction, and appearance evaluation following an exercise video than before it. However, while women tend to make comparisons based on overall shape and weight, men may make comparisons on weight and muscularity dimensions (McCreary & Saucier, 2009), which represent a male ideal. Arbour and Martin Ginis (2006) examined the effects of exposure to muscular and hypermuscular media images on young men's body image, including muscularity dissatisfaction. After exposing men to images of muscular or hypermuscular male physiques throughout a 30-minute health seminar, they found that with men higher in muscularity concerns, exposure to the muscular ideal and not the hypermuscular ideal (e.g., a body-builder) was associated with higher body dissatisfaction following exposure to the images. The authors suggested that men dissatisfied with their musculature may have made more social comparisons to the muscular images, leading to increased musculature dissatisfaction.

1.4 *Self-Presentational Concerns in Testing Environments*

Self-presentational concerns arise when people attempt to create (or avoid creating) a specific impression on others. Anyone can serve as a target of self-presentational related behaviours. Thus, any social situation has the potential to elicit self-presentational behaviours. Leary (1995) identified research settings as one in which self-presentational

related responses may arise. It is also possible that any type of testing setting can elicit similar self-presentational concerns.

1.4.1 ***Self-Presentational Concerns in Non-Physical Activity Settings.*** When dealing with human subjects, self-presentation is a concern as research participants may perceive they are under evaluation by the experimenter. In this case, the experimenter serves as the target. Participants typically have the desire to be viewed positively (e.g., helpful, friendly, smart) and make a favourable impression on the experimenter. Thus, subjects may not always behave "naturally" in studies, which can potentially lead researchers to draw incorrect conclusions (Leary, 1995). Subjects may also try to decipher a study's research questions or hypotheses, and then attempt to respond in ways that are consistent with them (Orne, 1962).

As noted previously, target characteristics may impact self-presentational concerns. These characteristics have been shown to alter behaviour in research environments. For example, in a study by Barnes and Rosenthal (1985), subjects described their experimenter more favourably on the Adjective Check List (ACL) when they were of opposite gender and attractive. Participants rated photographs of physically attractive people as more successful more often than they rated photographs of physically unattractive individuals (Barnes & Rosenthal, 1985).

Green, Sandall, and Phelps (2005) investigated whether the sex of the experimenter, formality of experimenter attire, and the sex of the participant affected respondents' productivity when asked to describe a business executive. The results revealed a significant interaction between experimenter sex and attire, as participants were able to generate more terms and took longer to describe the business executive when the female

experimenter was dressed casually and when the male experimenter was dressed professionally. This study reinforces the fact that researchers need to understand that a wide range of variables that are not the focus of the research investigation may alter the intended results. Although most of this research has examined participant responses in psychological research, it is likely that in other types of research or testing settings, these same responses may occur.

1.4.2 ***Self-Presentational Concerns in Physical Activity Settings.*** One such setting that might also be particularly likely to elicit self-presentationally-based responses is physical activity settings. Given the emphasis on physical appearance, as well as specific qualities such as strength for men, it may not be surprising that evidence suggests that physical activity settings, in which these characteristics are particularly relevant, may increase self-presentational concerns.

1.4.2.1 ***Situational Factors Influencing Self-Presentational Concerns in Physical Activity Settings.*** Several studies have examined factors in the physical activity environment that may increase self-presentational concerns. Environmental factors, including clothing type (Gammage, Martin Ginis et al., 2004, the presence of mirrors (Gammage, Martin Ginis et al., 2004; Lamarche, Gammage, & Strong, 2009), group member's attitudes (Martin & Fox, 2001), leadership styles (Martin & Fox, 2001), gender composition of the exercise group (Kruisselbrink et al., 2004) and characteristics of the leader (Lamarche & Gammage, 2009) can influence both physical and psychological responses in an exercise environment.

Lamarche et al. (2009) noted that a combination of environmental factors may be necessary to increase self-presentational concerns. In their study examining the impact of

the presence of mirrors on self-presentational concerns during exercise, they found that the presence of exercise mirrors failed to elicit increases in these concerns, and completion of the exercise class actually led to reductions in self-presentational concerns. However, other factors may in fact impact self-presentational concerns.

Martin and Fox (2001) examined the effects of the group environment and group leadership style on social anxiety experienced by participants in a 40-minute step aerobics class. Both the group environment (enriched/ bland) and the fitness instructor's leadership style (enriched/ bland) were manipulated. For the group environment, the confederates were thoroughly trained to provide either an enriched (socially supportive, friendly, interactive) or bland (neutral, noninteractive) social environment. The fitness instructor was trained to assume a leadership style that was either enriched (supportive and motivational, focusing on positive feedback), or bland (neutral and very technical, focusing on feedback to correct performance errors). Participants in both the enriched group condition and bland instructor group had significantly higher levels of social anxiety.

In addition to behaviours, physical characteristics of others may impact self-presentational concerns. Fleming and Martin Ginis (2004) conducted a study in which they manipulated the appearance of a model in an exercise video. Those individuals in the "perfect-looking" video wore revealing clothing (spandex shorts and a tank-top), while those in the "normal-looking" video wore non-revealing clothing (shorts and a t-shirt). After watching one of the two exercise videos, those women who watched the "perfect-looking" condition video reported lower levels of self-presentational efficacy regardless of their exercise status. The authors suggested that the ideal physique of the

video models may have decreased participants' confidence to present images of being an exerciser.

Gammage, Martin Ginis, and Hall (2004) conducted a study examining the influence of manipulated self-presentational efficacy on social anxiety in an exercise context. Self-presentational efficacy was manipulated in two separate groups, higher and lower self-presentational efficacy. In the lower self-presentational efficacy group, participants were told they would exercise while wearing short spandex shorts and a jog bra. They were also told that a male assistant would videotape close-ups of their performance, and that they would wear name tags to be more identifiable. In the higher self-presentational efficacy conditions, participants were told they would wear shorts and a t-shirt, and would be videotaped only as a group (with no male assistant present). However, neither group actually exercised. They concluded that individuals in the lower self-presentational efficacy group demonstrated higher levels of three measures of anxiety (social anxiety in exercise classes and social physique anxiety [both self-presentational concerns] and physical appearance anxiety [a body image variable]). From these results, they concluded that self-presentational efficacy has a potent influence on social anxiety in exercise contexts in women.

Laing (2006) attempted to replicate the study done by Gammage, Martin Ginis et al. (2004) using men in a weight lifting context. Once again, participants were randomly assigned to one of two groups (high and low self-presentational efficacy). They were read out a detailed procedural script of what was to take place within their training session, but did not actually perform the workout. Laing (2006) used two weight lifting scenarios in order to manipulate self-presentational efficacy. The scenarios differed in the attire to be

worn, the presence of mirrors, and the use of name tags. Specifically, in the low self-presentational efficacy group, participants were informed that they would be performing a circuit training workout wearing the provided attire (tight fitting shirt and tight fitting shorts) while being videotaped and wearing a name tag. They were also shown a photo of the group exercise room with the mirrors in the room left uncovered. In the high self-presentational efficacy group, by contrast, participants were told they would complete the identical circuit training workout wearing the provided attire (loose fitting t-shirt and loose fitting shorts) while being videotaped. They were also shown a photo of the group exercise room with the mirrors completely covered. However, the experimental manipulation was unsuccessful in creating two distinct self-presentational efficacy groups. The author noted that the same factors that increase self-presentational concerns in women in an exercise setting appear to not increase self-presentational concerns for men in a similar setting. She also suggested that other factors may be more relevant to men in a physical activity setting.

1.4.2.2. *Self-Presentational Concerns in Physical Activity Testing Settings.*

Given the impact of situational factors on self-presentational concerns in physical activity settings, it is possible that similar factors may be influential in evaluative settings, such as maximum strength testing. Lamarche et al. (2011) manipulated the gender of the experimenter to examine its impact on strength and social physique anxiety in a controlled environment during maximal isometric strength testing. However, there were no significant differences in maximal strength or social physique anxiety. The authors noted several limitations to the study that may have accounted for the lack of impact of experimenter gender. First, other forms of anxiety may be more

relevant in this setting (e.g., performance-related anxiety). Second, in this study, the muscle tested was the tibialis anterior. The majority of participants may not have seen this task as relevant or important, with limited established connections between this small muscle and overall strength, and for men, masculinity. Also, feedback was provided by means of electromyograhic amplitudes, which was likely not meaningful or relevant to the participants, meaning no valuable performance results were provided.

Maini (2010) conducted a study in an attempt to influence the social anxiety experienced by men during a 1-RM strength test by manipulating their self-presentational efficacy. In this case, small groups of men were randomly assigned to a high or low self-presentational efficacy group. The low and high self-presentational efficacy conditions were created based on work completed by Munroe-Chandler and Gammage (2008), which qualitatively examined factors in an exercise environment that could increase men's social anxiety during weight training. Participants in the study reported that anxiety primarily stemmed from concerns over appearing weak/ unskilled within this particular environment. The following five aspects were manipulated to create the high and low self-presentational efficacy groups: someone hovering over them wanting to use the equipment; if a spotter had to rush to assist them with the weight; if someone commented on their appearance; if their form was corrected by a trainer; and in the presence of an attractive woman.

In the low self-presentational efficacy group, participants were told other group members would be observing their maximal lifts while waiting to perform their own 1-RM. They were also told a personal trainer would be present to ensure they used correct form, and that their technique was to be perfect or the repetition would not count. An

attractive female trainer was present in the lab to assist with the tests. Participants were also told that their appearance and musculature would be evaluated by the personal trainers in order to rank the participants based on predicted maximal strength, and that participants would perform the tests in order based on these estimations. Lastly, the participants were shown a list of 1-RM values (which were significantly higher than norms for college-aged men) they were expected to lift with relation to one's overall mass.

In the high self-presentational efficacy group, participants were told they would complete the 1-RM test with only the trainer present, while the other participants were in another room. They were told the personal trainer would be present to promote proper technique and safety, although it was not essential to complete the lift with perfect form. Only the male trainer (and no female trainer) was present. Participants were told that they would complete the tests based on group member's names in alphabetical order. They were also provided with a list of extremely low maximal strength values (significantly lower than norms for college-aged men) they were expected to lift based on their respective weight in kilograms.

These manipulations were verbally described to participants in each group prior to completing a series of questionnaires. However, participants did not actually perform the 1-RM dumbbell chest press, and upon completion of the questionnaires, the participants were free to leave. This study failed to successfully manipulate self-presentational efficacy, although trends suggested that the means were in the expected directions. One potential reason for these non-significant findings may have been the relatively small sample size.

1.4.2.3. *Situational Factors Influencing Performance in Physical Activity Testing Settings.*

In an attempt to improve one's image and be perceived positively in the eyes of others, people tend to exercise harder and strive to perform better when others are watching (Leary, 1992). Baumeister (1982) reported that impression motivation can also influence task performance, as described in previous human performance research. Several studies have examined whether manipulating aspects of the social environment could impact physical performance outcomes.

For example, Worringham and Messick (1983) performed a study examining individual participant running speeds in differing scenarios. They continuously observed solitary joggers as they ran along a running path with different environments. Eighteen male and eighteen female younger adults participated in this study. They found that runners who came upon a female confederate who watched them run, ran faster than runners who came upon a confederate facing the other direction. They proposed a series of potential explanations for their results, but attributed their findings to social facilitation and evaluation apprehension, a self-presentational concern (Worringham & Messick, 1983). Specifically, they believed that participants ran faster when someone watched and evaluated their performance, in order to create a more positive impression.

Hardy, Hall, and Prestholdt (1986) examined perceived exertion (a subjective, rather than an objective measure of performance) in college-aged men during a cycling task. Nine college-aged males performed three 15-minute trials on a cycle ergometer at 25%, 50%, and 75% maximal oxygen uptake (VO_2 max). The authors found that in the presence of a coactor who appeared to find the task easy, participants subsequently rated their own subjective efforts lower than those who performed the task alone. Presumably,

these individuals had the desire to demonstrate they were as capable and fit as the participating coactor. Their findings supported the idea that psychological variables play a significant role in the self-perception of exertion (Hardy et al., 1986).

Further, Boutcher, Fleischer-Curtian, and Gines (1988) completed a study where participants performed two 18-minute sessions on a cycle ergometer at light, moderate, and heavy workloads in the presence of a male and female experimenter. Throughout these sessions, both heart rate and perceived exertion were collected. They found that men reported a lower rating of perceived exertion in the presence of the female experimenter when the exercise demands were at their highest, although there were no differences in heart rate. They interpreted these findings using a self-presentational explanation. Specifically, in the difficult task, they attempted to make themselves look good to the opposite sex by reporting lower effort, perhaps to make themselves appear more fit.

Grindrod et al. (2006) examined the impact of performing alone or in a group on performance during a six-minute walk test in men and women. They found that men increased the distance walked in six minutes by 12.5% and the women by 13.7% when they performed the test as a group rather than individually. They suggested that self-presentational motives could explain the differences, with participants walking faster when others were around and able to judge their performance, thereby making a more positive impression. Their findings support other studies suggesting that self-presentational motives can influence physical performance.

Within the field of resistance training, Rhea et al. (2003) investigated the effects of the presence of an audience and competition on maximal weight lifting performance.

Male and female participants completed a 1-RM bench press task in three different conditions: in front of an audience, in a competitive setting, and alongside another individual (coactions). Both men and women lifted significantly more weight in the 1-RM bench press task in the audience setting compared to the other conditions. The authors suggested that these findings could be interpreted as supporting self-presentational, self-awareness, and social facilitation theories. With respect to self-presentational motives and impression construction techniques, participants lifted more weight when others were attentively watching them in an attempt to be perceived as stronger and fitter to others (Carron & Prapavessis, 1997).

1.5 *Limitations to Extant Literature*

Several studies have shown it is possible to manipulate both self-presentational concerns and performance outcomes in physical activity settings by manipulating situational factors consistent with self-presentational theory, and factors that should impact self-presentational concerns (Hardy et al., 1986; Rhea et al., 2003; Worringham & Messick, 1983). Independently, studies that have shown changes in performance have implicated self-presentational concerns, but this factor has not been examined explicitly (e.g., Rhea et al., 2003; Worringham & Messick, 1983). On the other hand, studies that have explicitly manipulated specific self-presentational concerns (e.g., Fleming & Martin Ginis, 2004; Gammage, Martin Ginis et al., 2004; Maini, 2010) have not looked at performance outcomes. Thus, although we can hypothesize that self-presentational concerns can lead to changes in actual performance, no evidence exists to support this hypothesis. Further, the majority of these studies have simply examined the impact of the instructor or trainer on self-presentational concerns by requiring the participants to view a

short exercise video clip or imagine a setting without actually performing any form of exercise or actually being in this situation (Fleming & Martin Ginis, 2004; Gammage, Martin Ginis, et al., 2004; Laing, 2006; Maini, 2010; Sinden, Martin Ginis, & Angove, 2003). The present study attempts to fill these gaps.

1.6 *Significance*

In human performance testing, accurate results are critical to the development of safe and effective training protocols, and for determining the effectiveness of training programs. Thus, it is critical to ensure that values obtained using these protocols provide accurate results. Evidence suggests that the social and physical environment can play a critical role in influencing self-presentational concerns and performance outcomes in physical activity settings. As a result, it is important to determine (a) what factors can lead to these changes in self-presentational concerns and (b) if situational factors that impact self-presentational concerns in turn lead to changes in performance. If we are able to identify these factors, we can minimize them or at least control for them. We will also be able to determine the "best" practices for conducting human performance testing.

CHAPTER TWO: RATIONALE, PURPOSE, & HYPOTHESES

Research has suggested that characteristics of an exercise environment are capable of influencing self-presentational concerns including self-presentational efficacy, social physique anxiety, and social anxiety (Gammage, Martin Ginis et al., 2004; Lamarche & Gammage, 2009). Several characteristics have previously been examined within an exercise setting such as clothing type (Gammage, Martin Ginis et al., 2004; Sinden et al., 2003), the presence of mirrors (Gammage, Martin Ginis et al., 2004), presence of friends (Carron & Prapavessis, 1997), gender composition of the exercise group (Kruisselbrink et al., 2004), gender of the leader (Lamarche & Gammage, 2009), and leadership and group styles (Martin & Fox, 2001). These studies, however, investigated the effects of these manipulations on self-presentational outcomes, rather than actual performance. Other studies have suggested that similar factors may also impact human performance, although they have not explicitly examined self-presentational concerns (e.g., Boutcher et al., 1988, Rhea et al., 2003; Worringham & Messick, 1983).

2.1 *Rationale*

Maximal strength testing is common in a variety of settings and is a crucial element for monitoring progress or for evaluating one's physical potential. The values obtained from maximal strength testing scores can be used to evaluate strength, assess the effectiveness of training programs, and assign training loads, all critical aspects of effective training programs. The 1-RM test is considered the "gold standard" for obtaining maximal strength values (Barnard et al., 1999). Although physiological variables are assumed to be the main factors influencing performance on the 1-RM test, psychological variables may also be important (Grindrod et al., 2006; Rhea et al., 2003).

Therefore, it is important to examine psychological factors that may affect maximal strength values in a testing environment.

Given that the exercise leader can have an impact on exercise-related cognitions (Lamarche & Gammage, 2009), it is possible that in a strength testing context, the trainer could have a similar effect on self-presentational concerns and performance (Bain et al., 1989; Greenleaf et al., 2006). One factor that influences self-presentational concerns in physical activity settings is self-presentational efficacy, which is the subjective belief people hold about their own capabilities to successfully meet situational demands (Bandura, 1977).

For example, Gammage, Martin Ginis et al. (2004) investigated the effect of manipulated self-presentational efficacy on social anxiety, social physique anxiety, and body-related anxiety in female college students. They found that by manipulating situational factors in the exercise environment, they could manipulate self-presentational efficacy, which in turn led to changes in body image and body-related self-presentational concerns. They concluded that self-presentational efficacy expectancy appears to be a potent variable in both exercise behaviour and social physique anxiety. However, when Laing (2006) manipulated the same factors in a weight training environment with men, self-presentational efficacy was not successfully manipulated. She concluded that it is likely that different factors influence body-related self-presentational concerns in men than in women. In a strength testing environment, Maini (2010) attempted to influence social anxiety experienced by males in a strength testing environment by manipulating their level of self-presentational efficacy through factors previously reported to increase social anxiety in college men (e.g., presence of an attractive female, if a spotter had to

rush to assist them with the weight, if a trainer corrected their form, etc.; Munroe-Chandler & Gammage, 2008). Although Maini (2010) did not find any significant differences between low and high self-presentational efficacy groups, means for all variables were in the expected direction, with sample size believed to be the limiting factor.

Studies have also manipulated situational factors to look at their impact on physical performance. Worringham and Messick (1983) found that running speeds increased in an evaluative condition with a female confederate watching runners compared to situations without social evaluation (no confederate and a confederate facing away from them). Rhea et al. (2003) examined the effects of the presence of an audience and competition on maximal weight lifting performance. They concluded that both men and women demonstrated the highest performance outcomes in front of an audience compared to within a competition setting or within a coaction trial. Although both of these studies looked at performance outcomes, and they suggested that group differences could be due to self-presentational concerns, they failed to explicitly assess this contention. Therefore, the present study will address these limitations in the current literature.

Self-presentational efficacy is influenced by two primary factors: (1) the interpersonal load imposed by the social situations; and (2) the self-presentational resources available to meet the load (Leary & Kowalski, 1995). In general, situations perceived to be high in interpersonal load or low in self-presentational resources will decrease self-presentational efficacy (Leary & Kowalski, 1995). Ambiguous or new situations and specific characteristics of others can affect perceptions of the interpersonal load. For example, we tend to value the opinions and reactions of people with positive or

desirable characteristics more highly (e.g., physically desirable, intelligent, socially skilled) than those of less desirable individuals (Leary, 1992; Leary, 1995). Also, factors such as knowledge, skill or expertise can all increase the perceived status of a target, thus increasing interpersonal load and decreasing self-presentational efficacy. Individuals who are more powerful or influential may also have a similar effect (Leary, 1992). In the presence of an idealistic physique, body image and self-presentational concerns are predicted to promote decreases in self-presentational efficacy and increases in social physique anxiety, initiating a greater desire to impress.

The impact of musculature and expertise of the male trainer has yet to be examined in a maximal testing environment. Whereas women typically experience self-presentational concerns in relation to their body weight and shape, men are more likely to experience this form of anxiety as a result of a perception that they lack muscle mass and definition (Martin et al., 2006). Muscle mass and physical bulk is continuously strived for in modern North American culture (Mishkind et al., 2006; Pope et al., 2000). Therefore, it is likely that factors that influence perceptions of level of musculature and overall body image concerns can affect men's self-presentational concerns and performance within a strength testing environment.

2.2 *Purpose & Hypotheses*

In this study, the musculature and expertise of the trainer were manipulated to induce changes in self-presentational efficacy, and to assess the resulting effects on state social anxiety, state social physique anxiety, drive for muscularity, and maximal strength performance during a 1-RM chest press and leg press test. The specific hypotheses that were investigated are as follows:

A. It was hypothesized that college men tested by a muscular, expert trainer would achieve significantly higher 1-RM chest press and leg press values than college men tested by a lean, novice trainer.
B. It was hypothesized that college men tested by a muscular, expert trainer would report higher levels of state social anxiety compared to college men tested by a lean, novice trainer.
C. It was hypothesized that college men tested by a muscular, expert trainer would report higher levels of social physique anxiety compared to college men tested by a lean, novice trainer.
D. It was hypothesized that college men tested by a muscular, expert trainer would report a higher drive for muscularity compared to college men tested by a lean, novice trainer.

2.3 Assumptions

1. All male participants perceived a V-shaped torso, with broad shoulders, muscular upper body, flat stomach and narrow hips to be the ideal physique, as described in the muscular, expert trainer group condition.
2. All men put forth maximum effort in both 1-RM tests.
3. Participants perceived the trainers' expertise as hypothesized, according to the specified manipulations.
4. All men were motivated to make a desired impression on their respective trainer.
5. The randomization accounted for the variability in demographics among participants in the two manipulation groups, such that the two groups were not significantly different on demographic variables prior to the manipulations.

6. The trainer's behaviours were consistent across the two trainers, and from participant to participant.
7. All participants were naive to the true purpose of the study.
8. Participants answered all questionnaires accurately and honestly.
9. Participants were not influenced by the presence of the experimenter in the testing environment.
10. The participants did not know their respective trainer in this ambiguous situation.

2.4 *Delimitations*

1. This study included only able-bodied college-aged men (17-25 years) with a minimum of 6 months of previous weight training experience.
2. All participants were volunteers for the study.
3. Only specific self-presentational and body image outcomes (self-presentational efficacy, state social anxiety, social physique anxiety, and drive for muscularity) were investigated.
4. Only trainer muscularity and expertise were manipulated to determine their impact on self-presentational efficacy.

2.5 *Limitations*

1. Since only college-aged men (17-25 years) with a minimum of 6 months of weight training experience participated in this study, the results are generalizable to only this specific population.
2. Since participants are volunteers, those individuals with very high body image concerns (e.g., muscularity dissatisfaction) or high self-presentational concerns (e.g., social anxiety or social physique anxiety) likely chose not to participate.

Thus, the results likely applied to those without high body image or self-presentational concerns.

3. Other self-presentational concerns (e.g., fear of negative evaluation, self-monitoring) and body image concerns (e.g., importance of appearance, drive for leanness) may have also been relevant in this setting.
4. It is possible that other characteristics of the trainer (e.g., affect, ability to motivate others) could have also impacted body image or self-presentational concerns in college men.

CHAPTER 3: METHODOLOGY

3.1 *Participants*

One hundred and five male undergraduate and graduate students were recruited for this study. One participant was deleted due to age, and 5 others were deleted as outliers, which will be described later. As a result, the final sample consisted of ninety-nine participants. Previous literature (Maini, 2010) using a similar manipulation for self-presentational efficacy to examine its effects on social anxiety, social physique anxiety, and drive for muscularity, showed small to moderate effect sizes (ES; ES = 0.05, 0.35, 0.1, 0.27, respectively). A study by Rhea et al. (2003), in which participants performed a 1-RM bench press test in front of an audience (compared to just performing the task alongside other participants), yielded a large effect size (ES = 0.85). Overall, the ES in previous studies ranged from small to large. Sample size calculations, with power = 0.80 and α=0.05, indicated the recommended sample size was 26 (large ES), 64 (medium ES), and 393 (small ES) participants per group (Cohen, 1992). Given the slightly different manipulation compared to Maini (2010; i.e., trainer musculature and expertise), the fact that participants actually performed the 1-RM strength tests, and due to practical considerations, the sample size for the present study was deemed adequate.

Participants were recruited by means of announcements made in undergraduate classes (see Appendix A for verbal script) and posters placed around the Brock University campus (see Appendix B). Participants were college men between the ages of 19 and 24 years. The majority of the sample was primarily composed of students majoring in physical education and kinesiology (see Table 1 for sample characteristics). All participants had a minimum of 6 months of previous weight training experience and

were able to perform physical activity. Group descriptives are provided in Table 2 by group. Varsity athletes, bodybuilders, and personal trainers were excluded from this study due to their increased physical activity patterns, their generally more positive body image (Hausenblas & Downs, 2001), and because they are likely more experienced with weight lifting and strength performance evaluations (1-RM testing).

Table 1

Participant Academic and 1-RM Characteristics

Variable	Lean, Novice Trainer (n = 49)	Muscular, Expert Trainer (n = 50)
Major		
Physical Education/ Kinesiology	33	28
Math/Science	5	4
Social Science	3	8
Humanities/Education	1	2
Business	3	1
Other Applied Health Science	2	3
MSc./PhD.	2	4
Year in School		
1	1	0
2	13	7
3	18	15
4	13	15
4+	4	12
Previous 1-RM		
Yes	24	21
No	25	29

Table 2

Demographics and Physical Activity Variables by Group

	Lean, Novice Trainer (n=49)		Muscular, Expert Trainer (n=50)	
Variable	Mean	SD	Mean	SD
Age	21.11	1.48	21.58	1.46
# Times Strength	3.52	1.27	3.92	1.21
Strength Hours	4.80	2.50	5.57	2.95
Strength Years	3.69	1.86	4.12	2.21
Other Times	3.11	3.50	2.73	2.21
Other Hours	4.92	7.27	3.63	2.73
Height (M)	1.76	0.09	1.77	0.06
Weight (KG)	79.27	10.06	79.46	9.42
BMI	25.60	2.80	25.49	2.55

Note. # Times Strength= # Times/ Week of Strength Training; Strength Hours= # Hours/ Week of Strength Training; Strength Years= # Years of Strength Training; Other Times= # Times/ Week of Other Exercise; Other Hours= # Hours/ Week of Other Exercise; BMI= Weight (KG)/ (Height (M))^2.

3.2 *Measures*

Participants completed 4 sets of questionnaires within this study: baseline questionnaires for physical activity clearance and demographic information (Appendix C); pre-test and post-test measures assessing self-presentational concerns and body image (see Appendix D); and manipulation checks (see Appendix E).

3.2.1 ***Baseline Questionnaires*.** The baseline questionnaires consisted of the Physical Activity Readiness Questionnaire (PAR-Q), a demographics questionnaire, and an impression motivation measure.

3.2.1.1 ***Physical Activity Readiness Questionnaire (PAR-Q; Canadian Society for Exercise Physiology [CSEP], 2002).*** The PAR-Q consists of seven "yes" or "no" questions related to one's overall health status and is used as a clearance for physical activity. All participants answered "no" to all questions, and were therefore permitted to take part in the study. If a participant had selected "yes" to one or more of the questions, he would have been considered ineligible to participate.

3.2.1.2 ***Demographics.*** Age, major, year in school, and frequency and average time spent strength training and doing other physical activities each week were self-reported. Participants were also asked to report whether they had ever previously completed a one-repetition maximum test and what they believed their 1-RM values were for the chest press and leg press.

3.2.1.3 ***Impression Motivation.*** Social anxiety occurs when individuals are motivated to create a specific image in others' minds but are not 100% confident in their ability to do so (Leary & Kowalski, 1995). The impression motivation scale (Gammage, Hall, Prapavessis, et al., 2004) is a 4-item measure that assesses participants'

desire to make the specific impression of being an exerciser. An example question is "I try to appear toned or fit to others". Each question is answered on a rating scale from 1 = *strongly disagree* to 6 = *strongly agree*. Higher scores represent a greater desire to be perceived as an exerciser. This scale is revised from the Self-Presentation in Exercise Questionnaire (SPEQ; Conroy, Motl, & Hall, 2000) and has shown adequate psychometric properties in college men (Conroy et al., 2000; Gammage, Hall, et al., 2004). For the present study, internal consistency reliability was adequate ($\alpha = 0.84$; Nunnally & Bernstein, 1978).

3.2.2 ***Primary Measures: Pre-Test and Post-Test.*** The primary measures consisted of several measures of self-presentational concerns and body image constructs: self-presentational efficacy, state social physique anxiety, state social anxiety, and drive for muscularity. These measures were assessed prior to completing the maximal lifts, and once again following the 1-RM tests in the presence of the trainer. For the post-test measures, wording was slightly altered so participants responded with respect to the 1-RM tests just completed where appropriate.

3.2.2.1 ***Self-Presentational Efficacy.*** Self-presentational efficacy was assessed using the 5-item Self-Presentational Efficacy Expectancy for Exercise Scale (Gammage, Hall, et al., 2004). Participants indicated on a scale from 0% = *no confidence* to 100% = *completely confident* how confident they were that they could present themselves as an exerciser to others. Five impressions were assessed: physical co-ordination, body fitness and tone, stamina, exercise habits, and overall health. In previous studies, this scale has demonstrated adequate construct validity, acceptable internal consistency, and excellent test-retest reliability in college men (Lamarche, Gammage,

Sullivan, & Gabriel, Submitted; Maini, 2010). For the present study, the internal consistency reliability was good for both the pre-manipulation self-presentational efficacy (α = 0.89) and post-manipulation self-presentational efficacy (α = 0.93; Nunnally & Bernstein, 1978).

3.2.2.2 ***Social Physique Anxiety-State.*** The original Social Physique Anxiety Scale (Hart et al., 1989) assesses the degree to which people generally feel anxious from the perception that others are evaluating their bodies. In the current study, participants completed the 9-item state version of the original Social Physique Anxiety Scale- State (Kruisselbrink et al., 2004). Each question was answered on a 5-point Likert scale ranging from 1 = *not at all characteristic of me* to 5 = *extremely characteristic of me*. An example question was "I feel uptight about my physique/figure." Adequate reliability (α = 0.84), predictive validity, and construct validity of this measure have been documented in a variety of samples including college men (Kruisselbrink et al., 2004; Lamarche et al, 2011; Maini, 2010). For the present study, the internal consistency reliability was satisfactory for both the pre-manipulation social physique anxiety (α = 0.85) and post-manipulation social physique anxiety (α = 0.86; Nunnally & Bernstein, 1978).

3.2.2.3 ***State Social Anxiety.*** Social anxiety was assessed using the 4-item State Social Anxiety in a Weight Training Session Scale (Maini, 2010), which was modified from the original 8-item measure of State Social Anxiety in an Exercise Class (Martin & Fox, 2001) to be specific to a weight training environment in the presence of a personal trainer. This scale measured the level of concern over being evaluated negatively by a personal trainer. Each question was answered on a 5-point Likert scale

ranging from 1 = *not at all a concern* to 5 = *extreme concern*. A sample question was "I am concerned about looking uncoordinated in front of the personal trainer." Acceptable reliability was found for this particular scale in a sample of college men, with a Cronbach's alpha of 0.95 (Maini, 2010). For the present study, the internal consistency reliability was good for both the pre-manipulation state social anxiety (α = 0.89) and post-manipulation state social anxiety (α = 0.91; Nunnally & Bernstein, 1978).

3.2.2.4 ***Drive for Muscularity.*** The seven-item muscularity attitudes subscale of the Drive for Muscularity Scale (McCreary, Sasse, Saucier, & Dorsch, 2004), which assesses a desire to be bigger and more muscular, was used to measure muscularity dissatisfaction. This scale was adapted slightly to be more state-like by asking participants to report how they felt "right now". An example question was "I wish that I were more muscular". Participants indicated the extent to which each item applies to them utilizing a Likert scale ranging from 1 = *always* to 6 = *never*. In this particular scale, lower total scores indicated a greater drive for muscularity/ muscularity dissatisfaction. Internal consistency (α = 0.91-0.94) and acceptable reliability (α = 0.75) has been demonstrated in college men (Maini, 2010; Martin et al., 2006). For the present study, the internal consistency reliability was good for both the pre-manipulation drive for muscularity (α = 0.84) and post-manipulation drive for muscularity (α = 0.89; Nunnally & Bernstein, 1978).

3.2.3 ***Manipulation Checks*.** There were three manipulation checks: rating of perceived exertion (RPE), perceptions of trainer, and social comparisons.

3.2.3.1 ***Rating of Perceived Exertion.*** This measure was used as a manipulation check in order to ensure both groups were working maximally and self-

reporting approximately equal levels of exertion. The Borg Rating of Perceived Exertion (RPE; Borg, 1970) scale is a well-recognized and widely used measure to assess how hard an individual feels (s)he is working. Participants rated their perceived level of exertion following each of the maximal lifts on a scale ranging from 0 = *nothing at all* to 10 = *extremely strong-almost maximal*.

3.2.3.2 ***Perceptions of Trainer.*** This manipulation check ensured that the two trainers were perceived differently with respect to musculature and expertise. That is, it was used to make sure that the trainer in the muscular, expert trainer group was perceived as bigger and more muscular and as an expert compared to the trainer in the lean, novice trainer group. Two questions were asked to all participants. First, participants were presented with a series of silhouettes ranging from very small and non-muscular to very large and muscular (Lynch & Zellner, 1999). This measure contains nine drawings ranging from 1 to 9, gradually increasing in muscularity. Participants circled the image that they believed best resembled the build of the trainer. Second, participants were asked to rate their perceptions of the expertise, knowledge, experience, and qualifications of their trainer. Items were rated on a scale ranging from 1 = *not at all (e.g., knowledgeable)* to 5 = *extremely (e.g., knowledgeable).*

3.2.3.3 ***Social Comparison.*** Following the completion of the maximal lifts, participants responded to two questions indicating how they believed they compared to the trainer specifically in terms of muscularity and strength. They were asked to rate how they believed the trainer's 1-RM values would compare to their performance values for the chest press and leg press. Responses ranged from -2 = *much less* to +2 = *much*

more. In addition to strength, participants rated their muscularity in comparison to the trainer on a scale ranging from -2 = *much less muscular* to +2 = *much more muscular*.

3.3 *Procedures*

Ethics clearance was obtained from the Research Ethics Board at Brock University (see Appendix F). Individuals were recruited to participate in a study on self-beliefs and strength testing to conceal the true purpose of the study. Interested individuals were asked to contact the researcher via email. Once interest was shown from the potential participant, the researcher provided a letter of information (see Appendix G) and the inclusion/exclusion criteria via email. The researcher also invited any questions from the participant. After participants agreed to participate in the study, a mutually convenient date and time for participation was determined. At this time, the participant was then told to meet at the Exercise Intervention Lab (Welch Hall 16) on campus, already changed into clothing suitable to engage in physical activity. The researcher randomly assigned the participant to one of the two manipulation groups: the muscular, expert trainer group or the lean, novice trainer group, without the participant's knowledge.

Upon arrival at the lab, participants provided informed consent (see Appendix H) and completed the PAR-Q (CSEP, 2002). Individuals who responded "yes" to one or more of the questions were excluded from further study as they were not cleared for physical activity. Next, participants completed the demographic questionnaire and the Impression Motivation scale (Gammage, Hall, Prapavessis et al., 2004). During this time, the investigator was in the back room of the lab out of sight to provide a neutral environment for the participant; no one else was present at this time. This provided the

participant with time to complete the questionnaires in isolation, while the researcher was available to answer questions if needed.

Following the completion of the baseline questionnaires, participants completed the pre-test questionnaires (Self-Presentational Efficacy Scale, Social Physique Anxiety Scale- State, State Social Anxiety Scale, and Drive for Muscularity Scale), which were randomized to minimize order effects. Following completion of these questionnaires, the investigator introduced the participant to the trainer for the session. At this time, the investigator described the trainer's qualifications (see below). The trainer then obtained the participant's height to the nearest 0.1 cm by stadiometer and mass to the nearest 0.1 kg by means of a scale.

The trainer had the participant take a seat before providing detailed instructions for the performance of the 1-RM protocol (see below for details). Under the supervision and guidance of the trainer, participants completed their 1-RM lifts for the chest press and leg press exercises. During the 1-RM lift protocol, the researcher was present to record strength values while ensuring safety. He did not have any direct interaction with the participant during testing.

Immediately following the 1-RM tests, the participant completed a set of post-test questionnaires similar to those of the pre-test scales (Self-Presentational Efficacy Scale, Social Physique Anxiety Scale- State, State Social Anxiety Scale, and Drive for Muscularity Scale), but reworded slightly to reflect the tests they had just undergone. The post-test questionnaires were also randomized to avoid any order effects. Finally, they completed the manipulation check measures. Upon completion of these measures, the experimenter debriefed the participant as to the true purpose of the study and once again

provided the participant with the results of his 1-RM performances (see Appendix I). Finally, they completed the summary of results request form if desired (see Appendix J).

3.3.1 ***One-repetition maximum protocol.*** Although the 1-RM is the gold standard for assessing maximal strength, the literature is lacking a complete and reproducible protocol for this assessment with regards to novel users. Several very effective single visit protocols have been established, but typically a minimum of one essential element of the protocol is missing, making it difficult to replicate the protocols or compare results of 1-RM testing across studies (See Appendix K for a listing of previous protocols for 1-RM tests described in the literature and their limitations).

In order to address this limitation, a pilot study was undertaken to assess the reliability of a specific 1-RM protocol in college men with weight training experience (Appendix L). Briefly, 25 college men with at least 6 months of weight training experience completed the 1-RM protocol for the chest press and leg press exercises on 5 non-consecutive days. There were no significant differences in the 1-RM values across test days (p's > 0.05) indicating that the means were stable and the sums within subjects were very consistent. There was a consistency of scores within subjects as assessed by the intraclass correlation coefficient (ICC = 0.95 for chest press and 0.96 for leg press). As a result, the stability of means across test sessions and the consistency of scores within subjects indicated that the protocol for obtaining 1-RM values was reliable in college men with weight training experience.

Participants commenced the 1-RM test by performing a 5-minute warm-up on the treadmill. They began at a speed of 3.0 mph and progressed by 0.5 mph every minute to a 4.5 mph maximum. Following the general warm-up, the trainer described how to

correctly perform the chest press exercise and demonstrated correct technique. The trainers demonstrated the proper technique with an appropriate warm-up weight. Based on the muscularity and strength of the muscular, expert trainer, he selected a higher weight than the lean, novice trainer. Additionally, he made the 1-RM look easier to complete than the lean, novice trainer. The participant completed 10 repetitions with a light load (approximately 100 lbs.) to become familiarized with the machine and to perform a specific warm-up set. The participant, with the help of the trainer's experience, selected a weight for the chest press that he believed he would be unable to complete more than ten times. Then using the selected weight, the participant performed as many repetitions as possible to a maximum of ten. The Wathan formula (100*rep weight/ (48.8+53.8*exp [-0.075*reps])) was used to calculate a predicted 1-RM for the chest press based on the weight selected and the number of repetitions performed (LeSuer, McCormick, Mayhew, Wasserstein, & Arnold, 1997). The identical protocol was then performed to determine the predicted 1-RM for the leg press. Three-minute rest periods were given between each set to ensure adequate recovery.

For the chest press, the participant warmed-up by completing 5-10 repetitions at 40% of the estimated 1-RM. A 3-minute rest period was provided, and then he completed 3-5 repetitions at 70% of the estimated 1-RM. At this weight, if only three repetitions were able to be performed, the weight was increased to 90% of the predicted 1-RM. If four repetitions were able to be performed, the weight was increased to 95% of the estimated 1-RM. If five repetitions were able to be performed on this second warm-up set, the weight was increased to the estimated 1-RM value calculated from the Wathan formula. Participants then completed a single repetition at this new weight; if they were successful,

the weight was increased by the smallest amount possible, for a maximum of six further attempts. Participants then rested for 3 minutes, and the identical procedure was performed to obtain the actual 1-RM for the leg press. Participants then cooled down for 5 minutes on the treadmill. Feedback during testing was limited to instructional cues to ensure safe performance of all tests, with no motivational feedback provided.

3.3.2 ***Trainer characteristics and qualifications.*** For the present study, two trainers were used, one for each condition. Both trainers were college men and approximately the same height. Both had some form of experience in resistance training and were capable of administering a 1-RM test with adequate training. Both trainers wore the same fit and style of clothing (i.e., shorts and t-shirt), which was not extremely tight, but emphasized the physiques of the individuals (see Appendix M for photos of the two experimenters).

3.3.3 ***Experimental manipulation*****.** The manipulation was used to create two groups: a muscular, expert trainer group and a lean, novice trainer group. In order to create the two groups, the two trainers varied substantially with regards to their musculature and in the description of their experience and qualifications. In the muscular, expert trainer group, the trainer represented the ideal male physique in North America, with a well-developed musculature, broad shoulders and narrow hips. Muscle mass and physical bulk is continuously strived for in modern North American culture (Mishkind et al., 2006; Pope et al., 2000). Further, factors such as knowledge, skill or expertise can all increase the interpersonal load (Leary, 1995), which in turn decreases self-presentational efficacy. Specifically, high status and physically attractive individuals tend to increase perceptions of interpersonal load (Leary, 1992). This trainer was described as a certified

personal trainer (CPTN-CPT) and a certified strength and conditioning specialist (CSCS), with 5 years of experience as a personal trainer. He was described as having 10 years of weight training experience and having competed in several weight lifting competitions. Participants were told that he typically trains athletes and attends multiple conferences a year to further his personal training knowledge and level of education in the field.

In the lean, novice trainer group, the trainer was of similar height, but much smaller in stature and overall level of musculature. He had a leaner build with substantially less muscle mass. This trainer wore the identical style of clothing to emphasize his physique. This trainer was described as having recently obtained his Can-Fit-Pro Personal Trainer certification, and as looking to gain more experience. This description and appearance was predicted to decrease perceptions of interpersonal load, which should in turn increase self-presentational efficacy. Participants were told this trainer had been active and involved in physical activity his entire life, but only recently began weight training. They were told he was currently training middle-aged adults looking to stay healthy and get into better shape. All clothing, instructions, environment, and protocol remained identical between the two scenarios to isolate the specific manipulation.

3.3.4 ***Manipulation training*****.** In order to ensure consistency between the two experimenters, they were trained to administer the 1-RM protocol. Prior to commencement of the training sessions, both individuals met with the principal student investigator to go over the purpose of the study and their respective roles. The student investigator provided the trainers with a detailed set of instructions for the 1-RM protocol and the session checklist. He then demonstrated the full 1-RM protocol. Trainers had the opportunity to ask any questions for clarification purposes. Following this initial training,

they scheduled an individual session with the investigator to use the investigator as a practice participant.

At that time, the trainers went through the entire protocol with the researcher as the subject. Following this practice, the investigator debriefed and provided feedback to the trainer before scheduling a third training session. In this third session, both trainers tested one another on the protocol with the student investigator watching and using the checklist for consistency. Once the trainers were comfortable with the protocol and their styles were consistent, a final practice session was scheduled. At this point, each individual trainer performed a testing session on the investigator and was videotaped. The investigator used the checklist and watched each trainer's video. When each trainer achieved at least 95% accuracy, he was ready to begin testing. If he would have achieved less than 95% accuracy, he would have went through the final training session again until he completed the protocol sufficiently.

3.3.5 ***Checklist for Consistency*****.** A descriptive list was created to evaluate the consistency of the sessions between trainers (see Appendix N). This list was both used for training purposes and to evaluate consistency between the trainers during the data collection process. It included each step involved in the specific protocol in the order to be followed along with the appropriate instructional cues. Following the session, each trainer was provided a mark out of 47, which was subsequently converted into a percentage. Further, any additional unscripted cues, or out of order instructions were noted as errors.

CHAPTER FOUR: RESULTS

4.1 *Data Analysis*

All data were analyzed using SPSS 19.0. Initially, data were screened for entry errors and to check the assumptions of the statistical tests. Next, manipulation checks were conducted prior to hypothesis testing.

4.1.1 ***Screening Data*.** Prior to the analysis of any data, it was screened for missing and inaccurate values through the examination of frequencies of responses.

4.1.1.1 ***Missing Data*.** Missing data were visually screened. Only one item from one participant was missing. Since this item was a single item measure (perceptions of trainer's relative chest strength), the item was left blank for analysis.

4.1.1.2 ***Check for Inaccurate Values*.** Questionnaire items were screened for inaccurate values. A frequency count was conducted and visually screened to ensure each value was plausible. One inaccurate value was discovered, and the original response was revisited to obtain the correct value. This value was then substituted for the inaccurate value.

4.1.2 ***Subscale Scores*.** Items were reversed scored where appropriate. Specifically, two items on the pre and post- Social Physique Anxiety Scale- State scale were reverse coded such that the higher scores represented higher levels of social physique anxiety. Next, subscale scores were calculated using the mean score for each subscale.

4.1.2.1 ***Univariate and Multivariate Outliers*.** Univariate outliers are cases with an extreme value on one variable, while multivariate outliers are cases with a usual combination of scores on two or more variables. Among continuous variables,

univariate outliers are cases with very large standardized values, *z* scores, on one or more of the variables, and that happen to be disconnected from the other *z* scores. To screen for potential outliers, frequency plots were visually inspected, and *z* scores were calculated. Values with a standardized score (*z*-score) in excess of ± 3.29 ($p < .001$, two-tailed test) were investigated as possible univariate outliers (Tabachnick & Fidell, 2007). A total of seven values (three participants with one potential outlier score and two other participants having potential outliers on two variables) were identified. These cases were deleted prior to further data screening.

To assess for multivariate outliers, Mahalanobis' distance was calculated. These values were evaluated against x^2 with degrees of freedom equal to the number of variables of interest ($n = 6$) at $p < .001$ (Tabachnick & Fidell, 2007). Any case with a Mahalanobis' distance ≥22.46 was examined further as a potential multivariate outlier. There was no evidence of any multivariate outliers as all cases had a Mahalanobis distance <22.46.

4.1.3 ***Screening for Assumptions of Data Analyses*.** All data was screened to ensure that assumptions of the main analysis were met. These assumptions included normality, homogeneity of variance, linearity, and multicollinearity.

4.1.3.1 ***Normality*.** Means and standard deviations, as well as skewness and kurtosis values were calculated (see Table 3). Kurtosis is a measure of peakedness of the distribution, while skewness is a measure of the symmetry of the distribution (Tabachnick & Fidell, 2007). When a distribution is normal, the values of skewness and kurtosis are zero. Normality was assessed by significance tests (kurtosis ÷ standard error of kurtosis and skewness ÷ standard error of skewness) described by Tabachnick and Fidell (2007). As well, frequency histograms were examined. Drive for muscularity,

social physique anxiety, and self-presentational efficacy were found to be normally distributed. However, the pre- and post-manipulation state social anxiety variables were highly positively skewed, based on both significant skewness tests and examinations of the histograms. A logarithmic transformation was performed for each subscale; these subscales were then normally distributed.

Table 3

Descriptives for Self-Presentational Variables by Group

	Lean, Novice Trainer						Muscular, Expert Trainer					
Variable	*Mean*	*SD*	*Sk*	SE_{Sk}	*K*	SE_K	*Mean*	*SD*	*Sk*	SE_{Sk}	*K*	SE_K
IM	4.65	0.82	-0.15	0.34	0.24	0.67	4.60	0.88	-0.16	0.34	-0.19	0.66
PRESPEE	73.18	12.24	-0.93	0.34	0.40	0.67	78.20	11.29	-0.28	0.34	-0.10	0.66
PRESPA	2.07	0.61	0.65	0.34	0.38	0.67	2.05	0.64	0.38	0.34	-0.60	0.66
PRESSA	1.55	0.58	0.73	0.34	-0.82	0.67	1.51	0.61	1.43	0.34	1.99	0.66
PREDMS	3.43	0.94	-0.47	0.34	0.73	0.67	3.39	0.94	-0.37	0.34	0.56	0.66
POSTSPEE	75.05	12.10	-0.87	0.34	0.61	0.67	79.16	11.58	-0.26	0.34	-0.05	0.66
POSTSPA	1.78	0.52	0.50	0.34	-0.27	0.67	1.86	0.56	0.61	0.34	0.29	0.66
POSTSSA	1.46	0.58	1.57	0.34	2.43	0.67	1.62	0.65	0.89	0.34	0.02	0.66
POSTDMS	3.52	1.03	-0.75	0.34	0.39	0.67	3.38	0.98	-0.35	0.34	0.14	0.66
LOG PRESSA	0.16	0.15	0.39	0.34	-1.27	0.67	0.15	0.15	0.72	0.34	-0.37	0.66
LOG POSTSSA	0.14	0.15	0.89	0.34	-0.11	0.67	0.18	0.17	0.40	0.34	-1.14	0.66
Chest 1-RM	201.73	30.25	-	-	-	-	224.03	38.38	-	-	-	-
Leg 1-RM	321.39	44.61	-	-	-	-	356.10	60.04	-	-	-	-

Note. IM = impression motivation; SPEE = self-presentational efficacy expectancy; SPA = social physique anxiety; LOGSSA = logarithmic transformation of state social anxiety; DMS = drive for muscularity. IM ranges 1-6; SPEE ranges 0-100; SPA ranges 1-5; SSA ranges 1-5; DMS ranges 1-6.

4.1.3.2 ***Homogeneity of Variance*.** The assumption of homogeneity of variance is that the variance within each of the groups is approximately equal for each variable. This was tested by calculating F_{max} and then comparing it to the values as suggested by Tabachnick and Fidell (2007). F_{max} is the ratio of the largest cell variance to the smallest. Since the sample sizes were relatively equal (within a ratio of 4 to 1 or less for largest to smallest cell size), an F_{max} as great as 10 was considered acceptable (Tabachnick & Fidell, 2007). The sample sizes were approximately equal (n = 50 and 49). The homogeneity of variance assumption was met as all F_{max} values ranged from 1.02 to 2.26.

4.1.3.3 ***Linearity*.** Linearity occurs when a straight line relationship best describes two separate variables. Bivariate scatterplots by group for all possible combinations of variables by group were used in assessing the assumption that the data is linear (Tabachnick & Fidell, 2007). If both variables were normally distributed and related in a linear fashion, the scatterplot would be expected to be oval-shaped. In the case of this study, all relationships were linear as observed by the bivariate scatterplots.

4.1.3.4 ***Multicollinearity*.** Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Tabachnick & Fidell, 2007). Variables that were highly correlated (r = .90 or higher) were considered potential multicollinear variables (see Table 4 for all correlations by group). High correlations were expected between the same variable for pre- and post-testing; these values were deemed acceptable. There was no evidence of multicollinearity.

Table 4

Pearson Bivariate Correlations between Study Variables by Group

Variable	1	2	3	4	5	6	7	8	9	10
1. IM	1	0.49**	0.04	-0.25	0.47	0.04	-0.12	-0.38**	-0.05	0.08
2. PRESPEE	0.01	1	-0.46**	0.32*	0.85**	-0.36*	0.34*	-0.17	-0.50**	-0.28
3. PRESPA	0.26	-0.30*	1	-0.53**	-0.33*	0.70**	-0.56**	0.04	0.58**	0.59**
4. PREDMS	-0.26	0.30*	-0.62**	1	0.29*	-0.40**	0.89**	0.32**	-0.47**	-0.34*
5. POSTSPEE	0.04	0.88**	-0.30*	0.32*	1	-0.40**	0.35*	-0.24	-0.46**	-0.30*
6. POSTSPA	0.15	-0.31*	0.70**	-0.46**	-0.46**	1	-0.37**	0.15	0.55**	0.73**
7. POSTDMS	-0.24	0.27	-0.52**	0.93**	0.33*	-0.40**	1	0.23	-0.54**	-0.38**
8. BMI	0.17	-0.11	0.31*	-0.15	-0.03	0.21	-0.11	1	-0.11	-0.03
9. LOGPRESSA	0.23	-0.36*	0.59**	-0.46**	-0.40**	0.63**	-0.46**	-0.03	1	0.75**
10. LOGPOSTSSA	0.04	-0.24	0.66**	-0.42**	-0.37**	0.69**	-0.43**	-0.01	0.68**	1

Note. Lean, novice trainer group values shown above the diagonal; muscular, expert trainer group values shown below the diagonal. IM = impression motivation; SPEE = self-presentational efficacy expectancy; SPA = social physique anxiety; DMS = drive for muscularity; LOGSSA = logarithmic transformation of pre-manipulation state social anxiety; BMI = body mass index. PRE = pre-manipulation; POST = post-manipulation.
*$p<0.05$; **$p<0.01$.

4.1.4 *Manipulation Checks*

4.1.4.1 ***Randomization Check.*** The demographic data (age, height, weight, and physical activity) were analyzed to ensure the randomization worked effectively. A series of independent sample t-tests were used to ensure that the groups were not significantly different on demographic variables. There were no significant differences between the two groups on any demographic variables (all *p*s> 0.05). All means and standard deviations are provided by group in Table 2 and all academic and 1-RM characteristics are provided in Table 1.

4.1.4.2 ***Impression Motivation Check*.** The Impression Motivation Scale (Gammage, Hall, Prapavessis, et al., 2004) was used as a manipulation check to ensure that all participants had at least a minimal desire to make the impression of being an exerciser. For the current study, the range of scores was 2.25-6 for the impression motivation scale, indicating all participants were at least moderately motivated to create the impression of being fit. Further, a t-test showed there was no difference in impression motivation between the two groups ($p > .05$). Means, SDs, skewness and kurtosis are presented by group for this variable in Table 3.

4.1.4.3 ***Perceptions of Trainer*.** This manipulation check was used in order to ensure the two trainers in the separate conditions were perceived differently with respect to expertise and level of musculature. A series of independent sample t-tests were performed to compare the items between the two groups. For the social comparison silhouette scale, Levene's test for equality of variances was significant (p=0.03), therefore the degrees of freedom were adjusted. The trainer in the muscular, expert trainer group was perceived as significantly more muscular in comparison to the lean,

novice trainer ($t(84) = -17.73$, $p < 0.001$). The trainers were perceived significantly different on all variables (trainer experience $t(97) = -5.63$, $p<0.001$; trainer qualifications $t(97) = -2.75$, $p<0.01$; trainer expertise $t(97) = -3.92$, $p<0.001$), with the exception of their level of knowledge in the respective field ($t(97) = -1.65$, $p>0.05$). Specifically, the muscular, expert trainer was perceived as having significantly more experience, higher qualifications, and greater expertise than the trainer in the lean, novice group.

4.1.4.4 ***Social Comparison.*** This scale was used to obtain the participants' perceptions of their own musculature and strength in comparison to the trainer. A series of independent sample t-tests were performed to analyze the social comparisons between the lean, novice group and the muscular, expert group. The results showed that the trainers were perceived significantly differently with reference to overall physique, musculature and strength (1-RM chest press compared to trainer $t(96) = -15.46$, $p < 0.001$; 1-RM leg press compared to trainer $t(97) = -12.98$, $p < 0.001$; muscularity compared to trainer $t(97) = 10.97$, $p < 0.001$). The means and standard deviations of the social comparisons by group are provided in Table 5, and show participants in the muscular, expert trainer group perceived their trainer to be stronger and more muscular than themselves, while participants in the lean, novice trainer group perceived themselves to be stronger and more muscular than their respective trainer.

Table 5

Perceptions of Trainer and Social Comparisons by Group

	Lean, Novice Trainer		Muscular, Expert Trainer	
Variable	Mean	SD	Mean	SD
Chest Strength	-1.14	0.96	1.49	0.71
Leg Strength	-0.76	0.99	1.60	0.81
Musculature Comparison	0.80	0.90	-1.12	0.85
Knowledge	3.84	0.66	4.08	0.80
Experience	3.04	0.82	3.98	0.84
Qualified	3.69	0.68	4.12	0.85
Expertise	3.18	0.83	3.80	0.73
Trainer Musculature	32.45	10.51	64.40	7.05
Chest RPE	9.02	1.25	9.37	0.83
Leg RPE	9.07	1.02	9.19	1.25

Note. Chest strength ranges (-2)-(+2). (If you compare yourself to the trainer, how much weight do you think he could complete for a 1-RM on the chest press compared to you?). Leg strength ranges (-2)-(+2). (If you compare yourself to the trainer, how much weight do you think he could complete for a 1-RM on the chest press compared to you?). Musculature comparison ranges (-2)-(+2). (How do you see yourself compared to the trainer?). Knowledge ranges 1-5. (How knowledgeable do you think the trainer is in this field?). Experience ranges 1-5. (How experienced do you think the trainer is in this field?). Qualified ranges 1-5. (How qualified do you think the trainer is in this field?). Expertise ranges 1-5. (How much of an expert do you think the trainer is?). Trainer musculature ranges 10-90.

4.1.4.5 ***Rating of Perceived Exertion.*** This measure was used as a manipulation check in order to ensure both groups were working maximally and self-reporting approximately equal levels of exertion. Two independent sample t-tests were performed to compare the rating of perceived exertion values on the chest press and leg press tests between the lean, novice trainer group and the muscular, expert trainer group. Analyses showed no significant differences for the chest press ($t(97) = -1.64$, $p > 0.05$) or leg press ($t(97) = -0.52$, $p > 0.05$) rating of perceived exertion. The rating of perceived exertion values were near maximal, signifying that both groups were exerting maximally for the 1-RM tests. Means and standard deviations of the ratings of perceived exertion are provided by group in Table 5.

4.1.4.6 ***Checklist for Consistency.*** A descriptive list was created to evaluate the consistency of the sessions between trainers (see Appendix M). It included each step involved in the specific protocol in the order to be followed along with appropriate instructional cues. During each individual session, the researcher remained quietly out of direct view of the participant within WH 16 in order to record the accuracy of the protocol and instructions provided by the trainer. Any missed cue or instruction was marked as an error. Additional unscripted cues, or instructions out of order were also noted as errors, and a total score (# correct cues/instructions) was summed at the completion of each participant. A percentage correct score (# correct cues/instructions ÷ total possible cues/instructions * 100) was calculated. The number of warm-up sets and sets to maximum were also recorded for each individual session. Each trainer was given a mark out of 47 for every participant, which was converted into a percentage. The

percentages ranged from 97.9% to 100% (1 to 0 errors respectively). This error included a missed instructional cue on a single session.

4.1.4.7 ***Self-Presentational Efficacy.*** As the primary manipulation check, self-presentational efficacy was examined to see if this variable was successfully manipulated. An ANCOVA was utilized as the two groups differed with regards to pre-self-presentational efficacy ($t(97) = -2.12$, $p < 0.05$). With group as the independent variable, post-test self-presentational efficacy as the dependent variable, and pre-test self-presentational efficacy as the covariate, the ANCOVA was performed to compare the self-presentational efficacy values between the lean, novice trainer group and the muscular, expert trainer group. The results showed no significant difference in post-manipulation self-presentational efficacy between the two groups ($F(1, 96) = 0.05$, $p>0.05$). Therefore, the self-presentational efficacy manipulation was not successful.

4.1.5 ***Hypothesis Testing.*** Although the self-presentational efficacy manipulation was not successful, the trainers were perceived differently; therefore hypothesis testing occurred to see if differences in perceptions of the trainer led to differences in any of the self-presentational concerns, body image concerns or strength outcomes.

Hypothesis 1. In examining the hypothesis that the 1-RM values would be higher in the muscular, expert trainer group in comparison to the lean, novice trainer group, two independent sample t-tests were performed with the 1-RM chest press and 1-RM leg press values as the dependent variables. Analyses showed that the participants in the muscular, expert trainer group had significantly higher values on the chest press ($t(97) = -3.21$, $p = 0.002$) and leg press ($t(90) = -3.27$, $p = 0.002$) when compared to the

participants in the lean, novice trainer group. Means and standard deviations are provided in Table 1.

Hypotheses 2-4. Research questions 2-4 were analysed using a repeated measures MANOVA based on the fact that state social anxiety, social physique anxiety, and drive for muscularity were all moderately correlated (ranging from 0.34- 0.73). The MANOVA yielded a significant time effect ($F(3, 95) = 8.94$, $p<0.001$, $\eta^2 = 0.22$). Follow-up ANOVAs revealed a significant time effect for social physique anxiety ($F(1, 97) = 25.50$, $p = 0.000$, $\eta^2 = 0.21$), with no significant time effects observed for drive for muscularity ($F(1, 97) = 0.90$, $p = 0.34$, $\eta^2 = 0.009$) or state social anxiety ($F(1, 97) = 0.004$, $p = 0.95$, $\eta^2 = 0.000$). No significant main effect for group occurred for the present study ($F(3, 95) = 0.12$, $p> 0.05$, $\eta^2 = 0.004$). The means and standard deviations for the significant time effect are provided in Table 6.

Table 6

Significant Time Effect

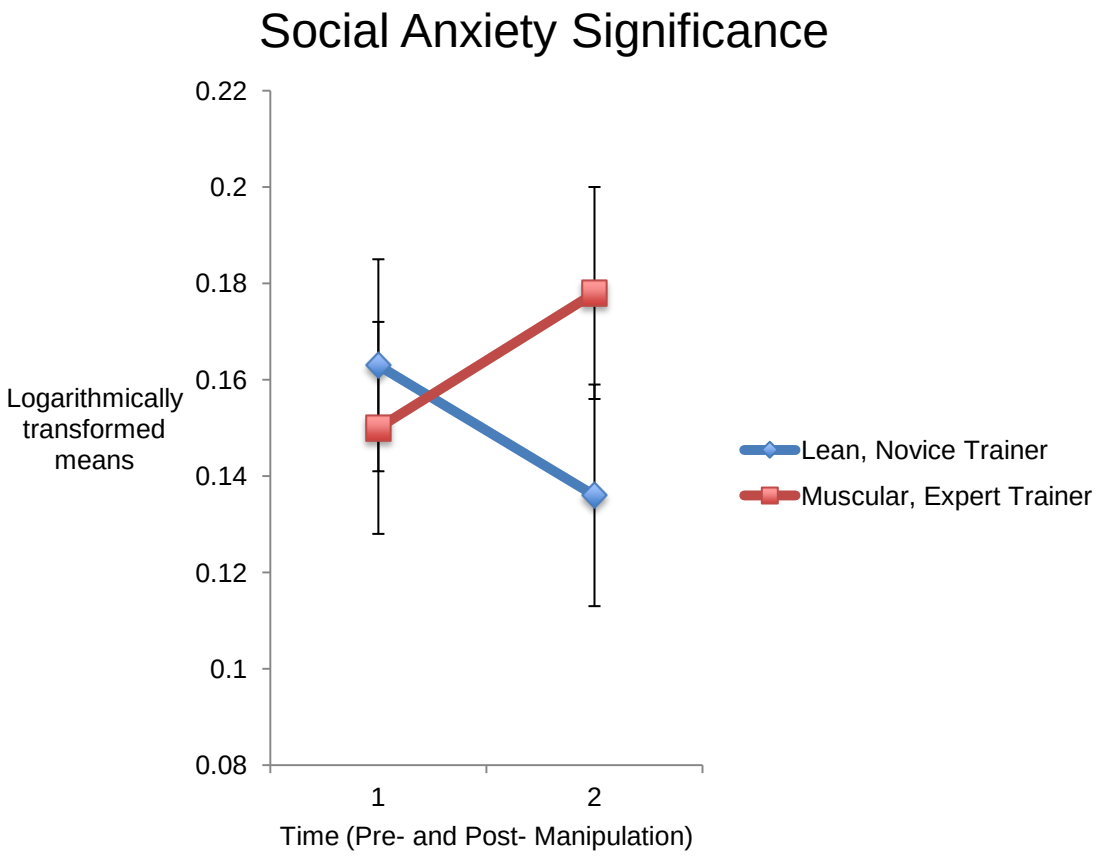
	Pre-Manipulation		Post-Manipulation	
Variable	M	SD	M	SD
SPA	2.06	0.62	1.82	0.54
DMS	3.41	0.94	3.45	1.00
LogSSA	0.16	0.15	0.16	0.16

Note. SPA = social physique anxiety; DMS = drive for muscularity; Log SSA = logarithmical transformation of state social anxiety.

The MANOVA also showed no significant interaction (Pillai's Trace $F(3, 95) = 2.46$, $p = 0.07$, $\eta^2 = 0.072$). Despite the fact there was no interaction observed, follow-up ANOVAs were assessed as the *p* value was approaching significance. The follow-up tests

for social physique anxiety ($F(1, 97) = 1.14$, $p = 0.29$, $\eta^2 = 0.01$) and drive for muscularity ($F(1, 97) = 1.32$, $p = 0.25$, $\eta^2 = 0.01$) were non-significant. However, a significant interaction was observed for social anxiety ($F(1, 97) = 5.14$, $p = 0.03$, $\eta^2 = 0.05$). Follow-up analyses showed an increase in social anxiety from pre- to post-manipulation was present among participants in the muscular, expert trainer group, while a decrease was observed from pre- to post-manipulation for participants in the lean, novice trainer group. Figure 1 has been provided to visually demonstrate the significance of the social anxiety variable from pre- to post-manipulation between groups.

Figure 1.



CHAPTER FIVE: DISCUSSION

The present study examined whether the musculature and expertise of a trainer influenced self-presentational efficacy, which in turn would influence social physique anxiety, drive for muscularity, state social anxiety and 1-RM performance for the chest press and leg press tests in previously trained college men. It was hypothesized that self-presentational efficacy would be lower and that all other variables (social physique anxiety, drive for muscularity, state social anxiety, and 1-RM performance) would be higher in the muscular, expert trainer group in comparison to the lean, novice trainer group. The trainer manipulation failed to change self-presentational efficacy. However, two distinct groups were created based on perceptions of trainer musculature and expertise, with this manipulation demonstrating a direct effect on social anxiety and performance. As hypothesized, the muscular, expert trainer elicited both higher maximal strength values and social anxiety in comparison to the lean, novice trainer. Beyond these findings, the other hypotheses were not supported, suggesting that the trainer's level of musculature and expertise are characteristics that may not influence self-presentational efficacy, social physique anxiety and drive for muscularity among college-aged, previously trained males.

5.1 *Descriptives*

Based on the mean impression motivation values, which ranged from 4.60-4.65 (rated on a 1-6 scale) for the present study, this specific population demonstrated a significant desire to be perceived as exercisers. In a previous study of college-aged men, the mean score on this same measure was 4.09, suggesting that the group in the present study may have been relatively higher in impression motivation than other samples of

college men (Lamarche et al., 2011). This finding suggests that this group may have been particularly susceptible to the manipulation, as self-presentational concerns should be higher when impression motivation is higher (Leary, 1995).

Values for post-self-presentational efficacy (which are used as comparison because only post-manipulation values have been examined in previous research) in the present study ranged from 75-79 (out of 100) were slightly higher than those reported in previous studies (i.e., Laing, 2006 [range 65-72]; Maini, 2010 [range 69-70]). Even when examining the present study's pre-self-presentational efficacy values (ranging from 73-78) in comparison to those values reported in Lamarche et al.'s (2007) male sample (ranging from 55-57), it appears that the present sample was particularly high with regards to this variable. Further, when compared to previous findings with college women, men in the present study had higher self-presentational efficacy (Gammage, Martin Ginis, et al., 2004; Lamarche et al., 2011).

Values for post-social physique anxiety (ranging from 1.78-1.86 out of 5) in the present study were consistent with those reported by Lamarche et al. (2011; range 1.67-1.94), although low in comparison to the values presented in Laing (2006; range 2.34-2.5) and Maini (2010; range 2.15-2.22). Values for post-social anxiety (ranged from 1.46-1.62) were low, consistent with those in previous literature (i.e., Laing [2006; range 1.46-1.94]; Maini [2010; range 1.6-1.89]). Finally, drive for muscularity values were relatively high (ranging from 3.38-3.52 out of 6) when compared to those in Maini's study (2010; range 4.06-4.26). These values suggest that the current sample was not particularly high in social anxiety and social physique anxiety, while demonstrating a high drive for muscularity. This sample may have been high in self-presentational efficacy and drive for

muscularity, while reporting relatively lower levels of overall anxiety due to the fact that all participants had a minimum of six months of previous weight training experience and nearly half of the sample had reported having previous experience with 1-RM testing.

5.2 *Self-Presentational Efficacy*

Similar to several previous studies that have attempted to manipulate self-presentational efficacy in men, the current study failed to create differences between the two groups (Laing, 2006; Maini, 2010) on this variable. Despite the significant differences in perceptions of the trainer, maximal strength performance and social anxiety between the two groups, no changes were reported with regards to self-presentational efficacy.

Even though self-presentational concerns are believed to be relevant to men, previous literature demonstrates that it is more difficult to manipulate these variables in men than women (Hargreaves & Tiggemann, 2009; Lamarche et al., 2011; Peat et al., 2011). There is an obvious gap in the exercise psychology literature with regards to how men's self-presentational concerns are influenced by features of the physical and social environment during physical activity. Despite the variety of attempts to manipulate body image and self-presentational concerns, limited success has been achieved in male samples. By comparison, self-presentational concerns including self-presentational efficacy, have been successfully manipulated in female samples (e.g., Gammage, Martin Ginis, et al., 2004). However, it is clear that men are not influenced by the same factors.

Laing (2006) provided evidence of this fact by replicating a study conducted by Gammage, Martin Ginis, et al. (2004) in an exercise setting among males. In both studies, the groups differed in the attire to be worn by participants, the presence of mirrors and

videotaping, and the use of name tags. However, Gammage, Martin Ginis et al. (2004) successfully manipulated self-presentational efficacy in women, while Laing (2006) was not able to manipulate this same variable in men using an identical protocol. In addition, Maini (2010) attempted to use results from a study by Munroe-Chandler and Gammage (2008) investigating factors in a weight training environment that would decrease self-presentational efficacy (e.g., someone hovering over them wanting to use the equipment, a spotter having to rush to assist them with the weight, etc.). However, again the authors failed to manipulate self-presentational efficacy in their sample of men. In the present study, specific characteristics (musculature and expertise) which should theoretically increase both interpersonal load and be highly relevant to men (Leary, 1995) were manipulated in an attempt to impact self-presentational efficacy in this population. There are several potential reasons as to why none of these studies, including the current one, have succeeded in manipulating self-presentational efficacy in men.

One potential explanation for the lack of change in self-presentational efficacy could be that men are hesitant to admit to experiencing low confidence in social situations, especially related to strength tests. There is societal pressure placed on men to appear both muscular and masculine (McCreary & Sasse, 2000). It is possible that participants may not have reported low levels of self-presentational efficacy related to strength training because it would not have been masculine to do so. For example, Mishkind et al. (1986) stated that men have difficulty acknowledging concern with regards to their appearance because bodily concerns have been stereotyped as a female concern. Further, Leary (1995) stated that gender norms suggest that men should be strong and powerful and should not express emotion. Thus, regardless of the trainer, men

may have been reluctant to admit they were not confident in their ability to appear fit and strong.

A second potential explanation for the lack of change in self-presentational efficacy may be that other characteristics within the strength testing setting played a more impactful role with regards to body-related concerns. Regardless of the level of musculature and expertise of the trainer, the task was somewhat ambiguous (i.e., no indication of the objective quality of their performance was provided during testing) and it was completed in a novel environment. Thus, the task characteristics may have had a greater impact on self-presentational efficacy over the characteristics of the trainer in this lab setting (Leary & Atherton, 1986; Leary & Kowalski, 1995).

Another reason the study may have failed to manipulate self-presentational efficacy may relate to the timing of measurements, which were assessed prior to meeting their trainer and after performing the 1-RM tests. From a study design perspective, participants interacted with their respective trainer for enough time to allow them to observe their physique and get a sense of their level of expertise. However, this increased interaction, and thus familiarity with the trainer may have also decreased the perceived interpersonal load and increased perceptions of self-presentational resources. Also, with a significant amount of time passing prior to completing the post-manipulation questionnaires, initial self-presentational concerns may have lessened nearing completion of the task. Further, due to the fact that the post-manipulation questionnaires were completed following the 1-RM lifts, not only were the responses influenced by the characteristics of the trainers, but also by their own performance. Despite the potential effect the trainer may have had on the participants' initial self-presentational efficacy, if that participant exceeded his

personal expectation on the two lifts, self-presentational efficacy may have increased. Bandura (1977) stated that success raises mastery expectations, while also increasing coping efforts and reducing fear in social situations. Given that the 1-RM values of the participants in the muscular, expert trainer group significantly exceeded those of the lean, novice trainer group, self-presentational efficacy may not have decreased with the muscular, expert trainer due to their higher level of performance. Although self-presentational efficacy was not manipulated in the present study, it should be noted that two separate groups were successfully created (muscular/expert and lean/novice). Thus, the analyses continued examining whether differences in perceptions of the trainers musculature and expertise influenced maximal strength performance and social anxiety.

5.3 *Hypothesis 1: 1-RM Performance*

The present study found that musculature and expertise of the trainer influenced 1-RM performance for both the chest press and leg press tests. Consistent with the hypothesis, the group with the muscular, expert trainer had significantly higher maximal strength values for both the chest press and leg press tests when compared to the group with the lean, novice trainer.

Within the literature, it is well recognized that both physical and social manipulations play a critical role in physical performance. Evidence suggests that physical performance is not only affected by physiological factors (Gabriel et al., 2006), but by psychological influences as well (Grindrod et al., 2006; Rhea et al., 2003; Worringham & Messick, 1983). Previously, performance has been successfully manipulated in a variety of settings by varying specific aspects of the social environment. For example, Worringham and Messick (1983) observed an increase in running speed

with the presence of an observing female (evaluation condition), in comparison to a setting where the female confederate had her back turned (mere presence) to the runner or where the runner ran with no female present. With respect to maximal strength testing, Rhea et al. (2003) were able to successfully manipulate 1-RM values in a bench press task by examining the effects of competition and the presence of an audience on weight lifting performance.

However, not all environmental manipulations have been successful in influencing performance. For example, Lamarche et al. (2011) manipulated gender of the experimenter while examining social physique anxiety and maximal strength in the tibialis anterior in college men and women. In this case, experimenter gender failed to elicit a significant difference in the maximal strength values. The present study extends this literature by demonstrating that specific characteristics of the target (i.e., muscularity and expertise) can impact performance in men. In the present study, this improved performance could be due to a number of contributing factors.

Several factors that could account for this increased maximal performance relate to self-presentational concerns other than self-presentational efficacy. Self-presentational concerns play an important role in today's society as self-presentation is capable of affecting one's social, psychological and financial outcomes (Leary, 1992). In particular, differences in maximal performance may relate to impression motivation and impression construction. The two component model developed by Leary and Kowalski (1990) states that the nature of the images we try to portray, and how we try to present those images is greatly affected by the target and is capable of influencing behaviours, exercise motivation, and affective responses (Greenleaf, McGreer, & Parham, 2006).

With respect to impression motivation, three situational factors influence the degree to which people are motivated to control how others perceive them. These three factors are: (1) the goal-relevance of impression; (2) the value of the desired goals; and (3) the discrepancy between one's desired and current social image (Leary & Kowalski, 1990). College years can be a particularly vulnerable time with respect to one's social identity; to be perceived positively by one's peers is a highly valued goal (Leary, 1995). For example, Chase and Dummer (1992) stated that being popular among peers is an important goal for college students. If a participant is capable of making a positive impression on others (e.g., the trainer), potentially his level of social acceptance will increase. When the target is considered to be powerful or possess highly valued traits, motivation to perform optimally and create a desired impression will inevitably increase (Leary, 1992, 1995). By contrast, motivation will tend to decrease with an individual's awareness of their superiority over a target with regards to particular characteristics (i.e., musculature, strength; Major et al., 1991). In the present study, the muscular expert target would likely be perceived as having higher status and more desirable traits than the lean, novice trainer, further increasing impression motivation.

One's appearance also helps determine social status and popularity (Chase & Dummer, 1992), which may further the desire to pursue a muscular and ideal body shape for young men. Among college-aged men, strength and muscularity are important attributes as they are associated with overall masculinity and power (Arbour & Martin Ginis, 2006; McCreary & Sasse, 2000). In addition to appearance, performance in this particular setting is both highly important and relevant (Leary, 1995). Again, given that strength is an important attribute for college men (Arbour & Martin Ginis, 2006;

McCreary & Sasse, 2000), performance on a 1-RM task is likely to increase impression motivation.

In addition to impression motivation, impression construction (how people go about choosing the images they will present and how they will present them; Leary & Kowalski, 1990) also played an important role in the present study. Again, three situational factors are thought to influence impression construction (target's values, role constraints, and social image; Martin Ginis & Leary, 2004). In general, people choose impressions that are consistent with the values of the target and with their current roles (Martin Ginis & Leary, 2004). The standard objective of self-presentation is to present an image consistent with one's perceptions of the audience's ideal (Hausenblas et al., 2004). Based on the muscular, expert trainer's physical characteristics, it is likely that the participants believed that muscularity and strength were two highly valued attributes for this individual; thus they would likely want to be seen as strong and muscular, consistent with his values. Further, high status targets increase perceptions of interpersonal load (Leary, 1995). Characteristics of the muscular trainer, such as high levels of physical attractiveness, power, knowledge, skill and expertise can all increase the perceived status of the target (Leary, 1995). These highly valued target traits are thought to motivate individuals to perform to their potential in an attempt to leave a desired impression. In addition, we value the opinions and reactions of people with desirable characteristics more highly in comparison to those with less attractive individuals, as they are generally perceived more positively and socially powerful (Leary, 1992, 1995). Individuals become aware that in order to please an audience, they must perform well with regards to the attributes or skills the target highly values. One way to achieve this goal is to perform as

well as possible on the 1-RM tests. Further, given that these men were all current strength trainers, it is likely that they already attempted, to some extent, to portray that they were strong and muscular to others. Performing as well as possible on the 1-RM would be consistent with this image.

In the case of the muscular, expert trainer in the present study, it could be inferred that musculature and strength were of significant importance to this individual. As a result, individuals in this group may have pushed themselves to their absolute potential in order to please the target and meet the likely high expectations of this individual. In the case of the lean, novice trainer, based on his overall physique and described experience in the field, it was likely inferred that musculature and strength were not considered a priority or highly valued attributes in this individual's life. With an adequate performance, individuals may have been fully aware that they were meeting, if not surpassing the probable expectations and capabilities of the trainer. Therefore, this study highly supports a principle tenet of self-presentation stating that self-presentations are tailored to the perceived values and preferences of the target (Leary, 1995).

Performance in the 1-RM tests could have also increased in the muscular, expert trainer group due to increases in social anxiety. Schlenker and Leary (1980) stated that social anxiety typically increases as the desire to self-present (i.e., impression motivation) increases. It is proposed that social anxiety arises when individuals are motivated to make a preferred impression on real or imagined audiences, but are unsure whether they will be successful, or perceive unsatisfactory evaluative reactions from subjectively important audiences (Schlenker & Leary, 1980). With the muscular, expert target's high

expectations due to their own attributes and values, one's anxiety may significantly elevate thinking they will be unable to meet these demanding expectations.

In addition, increased anxiety itself can elicit somatic or physical reactions (e.g., increased heart rate, muscle tension; Marquez & McAuley, 2001; Schlenker & Leary, 1982) in addition to cognitive ones. In most instances, anxiety will promote a higher level of physiological arousal (Martin Ginis, Strong, Arent, & Bray, 2012). Anxiety is mediated by the sympathetic nervous system, the portion of the nervous system that prepares us to deal with real or imagined threats to our well-being. As the sympathetic nervous system is activated, respiration, heart rate and muscle tension increases, while sweat pores open and digestion slows. These specific reactions prepare the individual to meet the demand of the threat (Leary & Kowalski, 1995). Blood flow decreases to peripheral blood vessels, such as those in the face and hands, whereas to the muscles and heart, blood flow increases. These precise responses occur to deal with imminent threats in the "fight or flight" reaction (Leary & Kowalski, 1995).

In 1908, Yerkes and Dodson developed the inverted-U hypothesis to explain the impact of anxiety on performance. It generally states that optimal performance is achieved in some intermediate state of arousal. If arousal is too low or too high, performance is predicted to suffer. When a person's performance relies on fine motor skills (e.g., playing the guitar, hitting a golf ball, etc.), anxiety, including social anxiety, can lead to decrements in performance (Leary & Kowalski, 1995). However, when a task is primarily composed of gross motor skills (e.g., weight lifting, walking, etc.), a higher state of physiological arousal is capable of supplementing performance (Leary & Kowalski, 1995). The maximal strength testing in the present study involves gross motor

tasks where anxiety would likely lead to increases in performance. Given that those in the muscular, expert trainer group experienced an increase in social anxiety, it is possible that physical changes associated with higher anxiety led to improvements in performance.

It is also possible that increases in 1-RM performance in the muscular, expert trainer group could have resulted from the social comparison process. Festinger's (1954) social comparison theory suggests that people have an innate drive to evaluate their own abilities and characteristics to determine their adequacy. Men's desire to live up to the ideal male body may also be influenced by processes of social comparison. An upward social comparison (i.e., to a superior target) was made by participants in the muscular, expert trainer group as they compared their task-relevant characteristics (i.e., musculature, strength) to those of their trainer. In the case of the lean, novice trainer group, a downward social comparison (i.e., to an inferior target) was made by those individuals in this group as they compared their typically superior characteristics to those of their respective trainer who did not meet the socially proscribed ideal.

These upward social comparisons have previously been demonstrated to result in significant cognitive and performance changes (Johnson & Stapel, 2007). In a study conducted by Leit et al. (2001), men were randomly assigned to view advertisements of either muscular men or neutral images. They concluded that the men who viewed the images of the muscular men reported a significantly greater discrepancy between their current physique and that of their perceived ideal compared to those viewing the neutral images. This increased discrepancy may increase one's motivation to perform better and match their perceived ideal. In a study by Mendes, Blascovich, Major, and Seery (2001), participants interacting with upward comparison partners within a cooperative social

interaction evaluated the task as more "threatening" (greater demands relative to resources) when compared to participants interacting with downward comparison partners. This upward comparison also led to increased physiological arousal including higher cardiovascular reactivity consistent with threat (e.g., increased ventricle contractility and vasoconstriction). In the muscular, expert trainer group in the current study, this upward social comparison likely increased impression motivation while promoting increased anxiety and physiological arousal, in turn increasing maximal performance.

5.4 *Hypotheses 2-4: Social Anxiety, Social Physique Anxiety and Drive for Muscularity*

As hypothesized, similar to 1-RM values with the muscular, expert trainer, and the lean, novice trainer, social anxiety differed significantly between the two groups. Reported social anxiety increased in the muscular, expert trainer condition, while decreasing in the lean, novice trainer group. Similar to self-presentational efficacy, musculature and expertise of the target were unsuccessful in manipulating social physique anxiety and drive for muscularity.

There are several reasons why the manipulation did lead to changes in social anxiety. First, social anxiety is thought to be increased in situations where impression motivation is higher (Leary & Kowalski, 1995). As noted above, it is likely that the muscular, expert trainer was perceived as a higher status, more powerful target and therefore was likely associated with increases in impression motivation. This change in social anxiety may be due to the fact that social anxiety, assessed using the 4-item State Social Anxiety in a Weight Training Session Scale (Maini, 2010), was more highly related to performance

than the scales used to measure social physique anxiety and drive for muscularity (Kruisselbrink et al., 2004; McCreary et al., 2004).

While social anxiety was influenced by differences in perceptions of the trainer, social physique anxiety and drive for muscularity were not. There are several potential reasons for this difference in outcomes. The measure of social anxiety directly assessed concerns over performance, which was related directly to the assessment in the current study (i.e., 1-RM performance - a direct evaluation of physical performance).

By contrast, social physique anxiety and drive for muscularity are more related to physical appearance. With this experimental design solely involving 1-RM chest press and leg press tests, no physique analysis or body assessment (e.g., body composition, measurements) took place. As a result, appearance concerns may have been less affected than social anxiety as related to performance. In addition, with body image primarily stereotyped as a feminine concern, participants may have been more reluctant to admit to body image concerns (Mishkind et al., 1986). Participants may have been less likely to report concern about physique rather than demonstrating increased social anxiety with regards to performance in the presence of the trainer.

Further, despite the fact that the measure of the drive for muscularity (McCreary et al, 2004) was adapted slightly to be more state-like by asking participants to report how they felt “right now”, it was originally conceptualized to be more trait-like. This scale contains more general questions related to participant attitudes about their bodies, in comparison to the highly state-like social anxiety and social physique anxiety scales. As a result, this measure may have contributed to the lack of significance observed in the drive for muscularity variable.

It is possible that the lack of change in self-presentational efficacy could account for the lack of change in social physique anxiety and drive for muscularity. In women, changes to social physique anxiety and body image variables have resulted from changes in self-presentational efficacy (Gammage, Martin Ginis, et al., 2004). Further, like self-presentational efficacy, social physique anxiety and drive for muscularity may have not been influenced due to timing of the measures. By placing the post-manipulation questionnaires following the maximal performance, a variety of factors could have contributed to the participants' responses and their psychological state at that time. If no difference had occurred between the two groups in maximal performance, body image and self-presentational concerns may have differed from the reported values. However, it possible that this increase in performance counterbalanced any social physique anxiety and body image concerns provoked by the muscular, expert trainer.

Merely by successfully completing the testing session, one's level of body image and self-presentational concerns may have decreased substantially from the point at which they initially met their respective trainer. With satisfaction knowing they had performed to their potential in an attempt to meet the demanding expectations of the muscular, expert trainer, drive for muscularity likely failed to change with experienced success and personal accomplishment. In addition, simply by knowing at that point, the session was complete and nothing more was expected from them may have affected their overall level of concern.

5.5 *Limitations*

As in all research, it is important to be conscious of the limitations of the present study. These findings can only be generalized to college-aged males with a minimum of

six months of previous strength training history. This manipulation may impact other populations very differently. With other populations (e.g., non- or infrequent exercisers, older adults, special populations, etc.) likely to report far lower impression motivation values in this setting, their desire to impress and create a specific impression may be considerably lower. Due to the fact that participation in this study was voluntary, those with high body image concerns (e.g., muscularity dissatisfaction) and/or self-presentational concerns (e.g., social physique anxiety) likely chose not to partake. Therefore, these findings most likely only apply to those without high body image and/or self-presentational concerns.

In addition to the examined variables, it is possible that other body image concerns (e.g., importance of appearance, drive for leanness) and self-presentational concerns (e.g., fear of negative evaluation) may have also been relevant in this setting. Despite the fact that every effort was taken to solely manipulate the desired variables (musculature and expertise), it is possible that other characteristics of the trainers (e.g., affect, ability to motivate others) could have also impacted body image and self-presentational concerns in college men. While the trainers adhered to a strict script regarding the protocol and necessary cues, some participants would ask questions out of curiosity and initiate conversation. Therefore, this further communication pulled in additional factors (e.g., personality, humour, confidence, etc.) outside of the manipulated variables that may have affected the dependent variables. In addition to the characteristics of the trainer, other uncontrollable factors may have played a role with respect to body image and self-presentational concerns (e.g., novel environment, maximal testing setting, etc.).

Despite the fact that the experimenter did not play a role in the testing protocol with the trainer, the mere presence of this individual may have potentially impacted the results. Simply knowing an additional individual was present with access to performance values may have affected the individual's performance and level of self-presentational concern. Leary (1995) stated that individuals may be highly influenced by their concerns with the experimenter's impressions and evaluations of them. This limitation could not have been avoided as the experimenter was present for ethical and safety concerns, as he was a certified personal trainer. In addition, the experimenter may have potentially elicited concerns while briefly introducing the study and providing the participants with their baseline questionnaires and primary measures.

Finally, despite the fact all reasonable variables were controlled for within this setting, participant clothing was self-selected. Participants were informed of the task requirements prior to their scheduled session and shorts and a t-shirt were recommended. With attire selection being a possible coping mechanism for trait self-presentational concerns, participants may have self-selected clothing in which they felt comfortable and less anxious wearing (Crawford & Eklund, 1994; Kowalski, Mack, Crocker, Niefer, & Fleming, 2006; Leary & Kowalski, 1995). Potentially, if attire was controlled for, a difference in the body image and self-presentational concerns may have been observed, with a desired motivation to appear fit in the presence of the muscular, expert trainer.

Although the specific chest press and leg press machines used were appropriate for a training facility, these machines were not ideal for maximal strength testing in college men. Specifically, the mean chest press performance values for both groups exceeded the standard capacity of the machine. Additional weight stacks were available and used when

necessary, although this may have instilled a sense of confidence and accomplishment knowing they were able to "max out" the machine. By utilizing more complex free weight exercises (i.e., squat and bench press) to conduct the 1-RM tests, a difference in self-presentational efficacy may have been observed for two reasons. First, the potential false sense of confidence from exceeding the maximal load of the machine would not be instilled. Second, as task complexity increases, there is an increased need for the trainer's presence and assistance, providing the muscular, expert trainer with the opportunity to emphasize his level of expertise through his spotting capabilities.

Finally, as with any self-reported questionnaires or scales, there is always the concern whether they will be accurately completed. One's level of social desirability is important, especially given the sensitive nature of some questions. It is possible that the lack of change in self-presentational efficacy, social physique anxiety, and drive for muscularity may have been due to the fact that men may be reluctant to show they are not confident or they are concerned about their appearance (McCreary & Sasse, 2000; Mishkind et al., 1986). Despite the fact all participants were reassured all information and results would be kept confidential, strategic responses may have been provided in a further attempt to self-present.

5.6 *Future Directions*

Given the fact the musculature and expertise manipulation affected perceptions of the trainer, leading to changes in strength performance and social anxiety, but not in several body image and self-presentational concerns, other variables may need to be examined. Munroe-Chandler and Gammage (2008) examined factors impacting social anxiety in males in the weight room. Potentially these key variables can be isolated to

examine their respective effects on performance and self-presentational concerns. Maini (2010) manipulated multiple variables proposed by Munroe-Chandler and Gammage (2008) to increase social anxiety, but failed to successfully manipulate self-presentational efficacy. Although the values were approaching significance in the expected direction, the small sample size was believed to be the limiting factor in this case. By increasing the sample size with this protocol, significance may be potentially achieved. Maini (2010) also chose to examine self-presentational concerns in anticipation of a 1-RM test, but did not assess performance. Thus, it would be important to replicate this study with participants actually completing the 1-RM test.

Previous literature has indicated that physical performance can be altered, but these performance increases only seem to occur with tasks deemed relevant and meaningful to the male population (Rhea et al., 2003; Worringham & Messick, 1983). Lamarche et al. (2011) manipulated the gender of the experimenter and examined social physique anxiety and maximal strength in the tibialis anterior assessed through a maximum voluntary contraction (MVC) test via electromyography. While the study failed to find a significant effect, it is unfair to state that the gender of the experimenter does not play a role in maximal strength or social physique anxiety in men. It is possible that men perceive the tibialis anterior as relatively unimportant with regards to overall masculinity, as men are primarily concerned with upper body musculature (Hargreaves & Tiggemann, 2009; Leit et al., 2001). Different results may also have been observed if this protocol was replicated with a more meaningful task, where performance has been previously manipulated (e.g., bench press, leg press), while providing more relevant feedback (i.e., 1-RM values vs. EMG results). This design would also examine the importance of task selection when

attempting to manipulate maximal performance and self-presentational concerns. A female trainer could then be incorporated into a design similar to the present study with a muscular and lean trainer. Further, the present study examined two factors (musculature and expertise) to determine if changes in performance results. Future research should isolate these manipulations and alter musculature alone (without expertise) and vice versa, to be able to conclude which manipulated variable (musculature or expertise) played a more critical role in the findings.

In the literature, the majority of studies with male participants have failed to manipulate body image and/ or self-presentational concerns (Laing, 2006; Lamarche et al., 2011; Maini, 2010). Several characteristics have been examined within an exercise setting such as clothing type, the presence of mirrors, presence of friends, gender composition of the exercise group, gender of the leader/ trainer, and leadership and group styles; these studies, however, investigated the effects of these manipulations on self-presentational outcomes, rather than actual performance (e.g., Gammage, Martin Ginis et al., 2004; Lamarche & Gammage, 2009; Lamarche, et al., 2009; Martin & Fox, 2001; Martin Ginis et al., 2008). Thus, it is important for these studies to be replicated while also including relevant performance measures (e.g., adherence, workload). Other studies have suggested that similar factors may also impact human performance, although they have not explicitly examined self-presentational concerns (Rhea et al., 2003). Similar to Rhea et al. (2003), Grindrod et al. (2006), and Worringham and Messick (1983) in the current study, an alteration in environmental characteristics elicited changes in performance. Unlike these studies, the present study examined specific self-presentational concerns, rather than simply attributing these gains by means of prediction.

This study attempted to link the two by examining how one specific self-presentational concern may have resulted in changes in performance. Although this study was unsuccessful with regards to manipulating self-presentational efficacy, further studies should continue to investigate how specific self-presentational concerns may impact performance.

5.7 *Implications*

5.7.1 *Implications for Research.*

The results of this study suggest that in order to ensure validity within any research study, it is critical to control for potential extraneous factors. With the present study supporting the fact that performance can be manipulated based on characteristics of the trainer, it is essential for researchers to be aware of this phenomenon. As stated by Rhea et al. (2003), potential self-presentational effects should be controlled for as they may aid the performance of weight lifting activities. As experimenter characteristics are capable of influencing results and affecting the dependent variable, it is important that this factor is both accounted and controlled for within a research setting, to increase validity of results.

Just as Green et al. (2005) investigated whether the sex of experimenter, formality of experimenter attire, and the sex of the participant affected respondents' productivity when asked to describe a business executive, this study reinforces the fact that researchers need to understand that a wide range of variables that may not be the primary focus of the research investigation may alter the intended results. For example, while a qualified individual is critical to carry out strength testing, physical and social characteristics of that individual should be considered in research settings to increase the validity of the findings.

5.7.2 ***Implications for Practice.*** As athletes continue to push the boundaries of human performance, the world of competitive sport continues to achieve new heights. Maximal performance testing has become extremely important in a variety of applied settings and at all levels of expertise. Whether to obtain baseline values for a training program, to monitor an athlete's progress, or to assign an athlete's rank during a competitive testing protocol, performance testing is frequently utilized.

Among others, this study has demonstrated that the social environment is capable of affecting performance (Rhea et al., 2003; Worringham & Messick, 1983). With experimenter musculature and expertise known to impact maximal strength performance, these findings can be effectively applied and utilized outside of a research lab setting. These findings will help in constructing the ideal environment for accurate maximal strength testing, and can be incorporated into physical performance testing facilities (e.g., fitness facilities, high performance testing locations, athlete combines). It is imperative to recognize that the environment is important when attempting to achieve one's physical potential. It is also important to be conscious of the fact that, when performing standardized performance testing on an athlete or between individuals, that the characteristics of the experimenter may potentially impact their results. Therefore, when comparing previously trained individuals, it is important with respect to validity, to utilize the same individual or experimenters/trainers with similar characteristics to complete the performance testing protocol.

In today's society, competitive training and maximal performance testing are rapidly growing industries. It would be optimal to formulate the ideal environment to maximize strength in a testing setting. With specific and isolated manipulations consistently

examined, this growing body of knowledge will assist in framing a model environment for maximal performance testing.

5.8 *Conclusion*

The present study found that the musculature and expertise of the experimenter impacted social anxiety and maximal strength values for the chest press and leg press, while failing to influence self-presentational efficacy, social physique anxiety, and drive for muscularity in college-aged males with a minimum of 6 months of previous strength training history. Prior to this study, the impact of musculature and expertise of the male trainer on performance and social anxiety had yet to be examined in a maximal testing environment. Participants were able to lift more for the 1-RM chest press and leg press when performing under the supervision of a muscular trainer described as an expert than a lean trainer described as a novice in the field. It is imperative to be realistic by acknowledging that not all individuals will be significantly influenced by the characteristics of the trainer eliciting an increase in physical performance. Some individuals are predominantly intrinsically motivated and are not as naturally inclined to self-present, although it would seem that this sample of men was, on average, motivated to form a desired impressions on others. Regardless of the increased strength values, other physical or social manipulations may also impact levels of body image and self-presentational concerns among college-aged men. This study assists in helping to develop the optimal environment to maximize strength within this population, while supporting previous literature suggesting the ability to manipulate performance through environmental alterations.

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APPENDIX A

Announcement in the Classroom

Good morning/ afternoon/ evening,

My name is Scott and I am a graduate student in the Applied Health Sciences Faculty here at Brock University and am currently conducting a study with Dr. Kimberley Gammage and Dr. David Gabriel on self-beliefs concerning one-repetition maximums in the weight room. This study has been reviewed and received clearance from the Brock University REB (file # 11-063). I am looking for male participants 17 years and older to partake in this study. You must have a minimum of 6 months of previous weight training in order to participate and must not currently be a varsity athlete, personal trainer, or bodybuilder. If you choose to participate, you will meet for an hour with a personal trainer and myself and fill out a series of brief questionnaires. Following this, we will obtain your one-repetition maximum values for the chest press and leg press exercises. You can use this study as one hour of participation for research credit. If you are interested in participating, you may contact me at sc06fw@brocku.ca. Thanks very much for your time and have a great day!

APPENIDIX B

Self-Beliefs Concerning the One-Repetition Maximum Test: Research Study

- **Male? At least 6 months of previous weight training? Currently not a personal trainer, bodybuilder or varsity athlete?**
- **Interested in finding out your 1-Repetition Maximum values?**

Complete a series of brief questionnaires and perform a 1-RM chest press and leg press with a certified personal trainer.

CREDIT FOR ONE HOUR OF RESEARCH PARTICIPATION!

Contact researchers to participate:

Scott Crozier- sc06fw@brocku.ca

Dr. Kimberley Gammage- kgammage@brocku.ca

Dr. David Gabriel- dgabriel@brocku.ca

One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or	One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or	One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or	One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or	One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or	One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or	One-Repetition Maximums in the Weight Room **Male Participants** Contact: sc06fw@brocku.ca or

APPENDIX C

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	**Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2.	**Do you feel pain in your chest when you do physical activity?**
☐	☐	3.	**In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4.	**Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5.	**Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6.	**Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7.	**Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

→

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

CSEP | SCPE

Demographic

Age: _____

Major: _____ Year in School: _____

Times/ Week of Strength Training: _____

Hours/ Week of Strength Training: _____

Years of Strength Training: _____

Times/ Week of Other Exercise: _____

Hours/ Week of Other Exercise: _____

Have you ever performed a one-repetition maximum test (1-RM) before?

YES NO

What do you think is the **maximum** amount of weight you can lift **one time only** on the chest press machine: _____lbs

What do you think the **maximum** amount of weight you can lift **one time only** on the leg press machine: _____lbs

Impression Motivation

Response Scale

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Somewhat Disagree	Somewhat Agree	Moderately Agree	Strongly Agree

1. I value the attention and praise of others when they regard me as being in good shape. _____

2. I enjoy the praise I receive for exercising. _____

3. I try to appear toned or fit to others. _____

4. I value the attention and praise offered by others in regard to appearing physically fit. _____

APPENDIX D

SPEE (Pre-Test)

Think about the weight lifting session you will be participating in today. Using any values from this scale (0% to 100%), please indicate how confident you are for each of the following:

0	10	20	30	40	50	60	70	80	90	100
No Confidence										Completely Confident

How confident are you that……..

1. Other people will think that you have good physical coordination?	_____%
2. Other people will think that your body looks fit and toned?	_____%
3. Other people will think that you have good stamina?	_____%
4. Other people will think that you are someone who works out regularly?	_____%
5. Other people will think that you are in good shape?	_____%

SPAS-S (Pre-Test)

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you **in this situation**. Use the following scale. Circle the appropriate value following each statement.

1 = Not at all characteristic of me
2 = Slightly characteristic of me
3 = Moderately characteristic of me
4 = Very characteristic of me
5 = Extremely characteristic of me

1.	I feel uptight about my physique/figure.	1	2	3	4	5
2.	I am bothered by thoughts that the other people in the room are evaluating my weight or muscular development negatively.	1	2	3	4	5
3.	Unattractive features of my physique/figure make me nervous in this setting.	1	2	3	4	5
4.	In this environment, I feel apprehensive about my physique/figure.	1	2	3	4	5
5.	I am comfortable with how fit my body appears to the others.	1	2	3	4	5
6.	It would make me uncomfortable to know that other people in the room were evaluating my physique/figure.	1	2	3	4	5
7.	When it comes to displaying my physique/figure in this setting, I feel shy.	1	2	3	4	5
8.	Sitting here in my workout clothes, I feel nervous about the shape of my body.	1	2	3	4	5
9.	I feel relaxed when it is obvious that others are looking at my physique/figure.	1	2	3	4	5

SSA in a Weight Training Session (Pre-Test)

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you as you think of **today's** weight lifting session. Use the following scale for your ratings:

1	2	3	4	5
Not at all a Concern	Slightly a Concern	Average Concern	Above Average Concern	Extreme Concern

1. I am concerned about looking uncoordinated in front of the personal trainer	1	2	3	4	5
2. Throughout the weight training session, I will be worried about embarrassing myself in front of the personal trainer	1	2	3	4	5
3. During the weight training session, I am worried the personal trainer will be evaluating my physique/figure.	1	2	3	4	5
4. I am concerned that the personal trainer will think that I am in poor physical condition	1	2	3	4	5

DMS (Pre-Test)

Please read each item carefully then, for each statement, circle the number that best applies to you.

1	2	3	4	5	6
Always	Very Often	Often	Sometimes	Rarely	Never

1. I wish that I were more muscular	1	2	3	4	5	6
2. I think I would feel more confident if I had more muscle mass	1	2	3	4	5	6
3. I think that I would look better if I gained 10 pounds in bulk	1	2	3	4	5	6
4. I think that I would feel stronger if I gained a little more muscle mass	1	2	3	4	5	6
5. I think that my arms are not muscular enough	1	2	3	4	5	6
6. I think that my chest is not muscular enough	1	2	3	4	5	6
7. I think my legs are not muscular enough	1	2	3	4	5	6

SPEE (Post-Test)

Think about the weight lifting session you participated in today. Using any values from this scale (0% to 100%), please indicate how confident you are for each of the following:

0	10	20	30	40	50	60	70	80	90	100
No Confidence										Completely Confident

How confident are you that……..

1. Other people will think that you have good physical coordination?	_____%
2. Other people will think that your body looks fit and toned?	_____%
3. Other people will think that you have good stamina?	_____%
4. Other people will think that you are someone who works out regularly?	_____%
5. Other people will think that you are in good shape?	_____%

SPAS-S (Post-Test)

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you **in this situation**. Use the following scale. Circle the appropriate value following each statement.

1 = Not at all characteristic of me
2 = Slightly characteristic of me
3 = Moderately characteristic of me
4 = Very characteristic of me
5 = Extremely characteristic of me

1.	I felt uptight about my physique/figure.	1	2	3	4	5
2.	I was bothered by thoughts that the other people in the room were evaluating my weight or muscular development negatively.	1	2	3	4	5
3.	Unattractive features of my physique/figure made me nervous in this setting.	1	2	3	4	5
4.	In this environment, I felt apprehensive about my physique/figure.	1	2	3	4	5
5.	I was comfortable with how fit my body appears to the others.	1	2	3	4	5
6.	It made me uncomfortable to know that other people in the room were evaluating my physique/figure.	1	2	3	4	5
7.	When it comes to displaying my physique/figure in this setting, I felt shy.	1	2	3	4	5
8.	Sitting here in my workout clothes, I felt nervous about the shape of my body.	1	2	3	4	5
9.	I felt relaxed when it is obvious that others are looking at my physique/figure.	1	2	3	4	5

SSA in a Weight Training Session (Post-Test)

Read each of the following statements carefully and indicate the degree to which the statement is characteristic or true of you as you think of **today's** weight lifting session. Use the following scale for your ratings:

1	2	3	4	5
Not at all a Concern	Slightly a Concern	Average Concern	Above Average Concern	Extreme Concern

1. I was concerned about looking uncoordinated in front of the personal trainer	1	2	3	4	5
2. Throughout the weight training session, I was worried about embarrassing myself in front of the personal trainer	1	2	3	4	5
3. During the weight training session, I was worried the personal trainer was evaluating my physique/figure.	1	2	3	4	5
4. I was concerned that the personal trainer was thinking that I am in poor physical condition	1	2	3	4	5

DMS (Post-Test)

Please read each item carefully then, for each statement, circle the number that best applies to you.

1	2	3	4	5	6
Always	Very Often	Often	Sometimes	Rarely	Never

1. I wish that I were more muscular	1	2	3	4	5	6
2. I think I would feel more confident if I had more muscle mass	1	2	3	4	5	6
3. I think that I would look better if I gained 10 pounds in bulk	1	2	3	4	5	6
4. I think that I would feel stronger if I gained a little more muscle mass	1	2	3	4	5	6
5. I think that my arms are not muscular enough	1	2	3	4	5	6
6. I think that my chest is not muscular enough	1	2	3	4	5	6
7. I think my legs are not muscular enough	1	2	3	4	5	6

APPENDIX E

RPE

Using the scale below, which number best describes your level of exertion

0	nothing at all
.5	extremely weak (just noticeable)
1	very weak
2	weak (light)
3	moderate
4	somewhat strong
5	strong (heavy)
6	
7	very strong
8	
9	
10	extremely strong (almost maximal)

My level of exertion was: _____.

Perceptions of Trainer

1. If you compare yourself to the trainer, how much weight do you think he could complete for a 1-RM on the chest press compared to you?

-2	-1	0	+1	+2
MUCH LESS	*SOMEWHAT LESS*	*EQUALLY AS MUCH*	*SOMEWHAT MORE*	*MUCH MORE*

2. If you compare yourself to the trainer, how much weight do you think he complete for a 1-RM on the leg press compared to you?

-2	-1	0	+1	+2
MUCH LESS	*SOMEWHAT LESS*	*EQUALLY AS MUCH*	*SOMEWHAT MORE*	*MUCH MORE*

3. How do you see yourself compared to the trainer?

-2	-1	0	+1	+2
MUCH LESS MUSCULAR	*SOMEWHAT LESS MUSCULAR*	*EQUALLY AS MUSCULAR*	*SOMEWHAT MORE MUSCULAR*	*MUCH MORE MUSCULAR*

4. How knowledgeable do you think the trainer is in this field?

1	2	3	4	5
Not at all				Extremely

5. How experienced do you think the trainer is in this field?

1	2	3	4	5
Not at all				Extremely

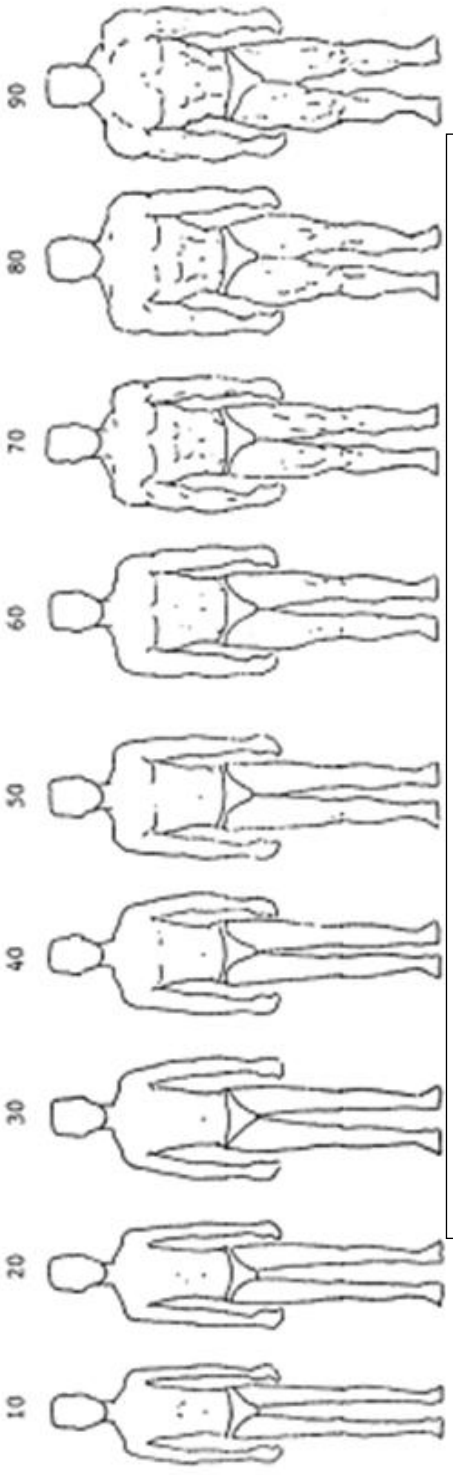
6. How qualified do you think the trainer is in this field?

1	2	3	4	5
Not at all				Extremely

7. How much of an expert do you think the trainer is?

1	2	3	4	5
Novice				Expert

Social Comparison



Please circle the figure that you believe best represents the trainer you worked with today

APPENDIX F

Brock University
Research Ethics Office
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Bioscience Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE:	11/8/2011		
PRINCIPAL INVESTIGATOR:	GAMMAGE, Kimberley - Kinesiology		
FILE:	11-063 - GAMMAGE		
TYPE:	Masters Thesis/Project	STUDENT:	Scott Crozier
		SUPERVISOR:	Kimberley Gammage

TITLE: The Effects of Experimenter Musculature on Self-Presentational Concerns and One-Repetition Maximum Performance: Chest Press and Leg Press

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 11/30/2012

The Brock University Bioscience Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 11/8/2011 to 11/30/2012.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 11/30/2012. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page at http://www.brocku.ca/research/policies-and-forms/research-forms.

In addition, throughout your research, you must report promptly to the REB:

a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
c) New information that may adversely affect the safety of the participants or the conduct of the study;
d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved: 

Brian Roy, Chair
Bioscience Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

APPENDIX G

Letter of Information

Date: Fall 2011
Project Title: Self-Beliefs Concerning the One-Repetition Maximum Test: Chest Press and Leg Press.

Principal Investigator: Dr. Kimberley Gammage, Associate Professor, Department of Kinesiology, Brock University

Principal Student Investigator: Scott Crozier, M.Sc. Candidate, Faculty of Applied Health Sciences, Brock University

Co-investigator: Dr. David Gabriel, Professor, Department of Kinesiology, Brock University

I, Kimberley Gammage, Associate Professor, from the Department of Physical Education and Kinesiology, Brock University, invite you to participate in a research project entitled: Self-Beliefs Concerning the One-Repetition Maximum Test: Chest Press and Leg Press.

The purpose of this research project is to identify individual's self-beliefs regarding the one-repetition maximum tests for the chest press and leg press.

The expected duration is 1 hour total.

You may receive credit for 1 hour of research participation if you take part in the study. You will also receive feedback on your one-repetition maximums for the chest and leg press tests.

If you have any questions about your rights as a research participant, please contact the Brock University Research Ethics Officer (905 688-5550 ext 3035, reb@brocku.ca)

If you have any questions, please feel free to contact me.

Thank you,

Principal Investigator:
Dr. Kimberley Gammage, Associate Professor
Dept. of Kinesiology
Brock University
905-688-5550 (x3772)
kgammage@brocku.ca

Student Supervisor:
Scott Crozier, M.Sc. candidate
Faculty of Applied Health Sciences
Brock University
905-246-4090
sc06fw@brocku.ca

Co-Investigator:
Dr. David Gabriel, Professor
Dept. of Kinesiology
Brock University
905-688-5550 (x4362)
dgabriel@brocku.ca

This study has been reviewed and received ethics clearance through Brock University's Research Ethics Board (file # 11-063)

APPENDIX H

Informed Consent

Date: Fall 2011
Project Title: Self-Beliefs Concerning the One-Repetition Maximum Test: Chest Press and Leg Press.

Principal Investigator:
Dr. Kimberley Gammage, Associate Professor
Dept. of Kinesiology
Brock University
905-688-5550 (x3772)
kgammage@brocku.ca

Principal Student Investigator:
Scott Crozier, M.Sc. candidate
Faculty of Applied Health Sciences
Brock University
905-246-4090
sc06fw@brocku.ca

Co-Investigator:
Dr. David Gabriel, Professor
Dept. of Kinesiology
Brock University
905-688-5550 (x4362)
dgabriel@brocku.ca

INVITATION

You are invited to participate in a study that involves research. The purpose of this study is to assess self-beliefs concerning the one-repetition maximum tests, for the chest press and leg press.

WHAT'S INVOLVED

As a participant, you will be asked to come in on one single occasion to complete several questionnaires and a one repetition maximum test for the chest press and leg press. You will be asked to the following: after warming up with a 5-minute walk on the treadmill, the researchers will help you select a weight that you will be able to lift using the chest press machine no more than 10 times. You will lift this weight as many times as possible. This value will be used to calculate a predicted 1-repetition maximum value (the highest amount of weight you can lift only 1 time). You will repeat this procedure for the leg press machine. You will then do several sets of the chest press under this 1-repetition maximum amount to warm up; then you will attempt to lift your estimated 1-repetition maximum amount a single time, and if you are successful, you will continue to attempt lifting a greater amount until you can no longer lift it. This procedure will then be completed for the leg press task. Finally, you will perform a cool-down on the treadmill. (Total time: approximately 1 hr.).

POTENTIAL BENEFITS AND RISKS

You will be provided with immediate personal maximal strength feedback and can obtain overall study results 1 month following data collection. You can receive credit for one hour of research participation. With maximal strength testing, there is a risk of muscular soreness, fatigue and injury may result. These risks have been minimized with an adequate warm-up and cool down. Also, the experimenter is a certified personal trainer who will be present for all testing sessions, and will stop the testing process if he feels anything is being done improperly or unsafely. There is also a risk due to the nature of some of the questions being asked. If you experience any discomfort, you may contact

the principal investigator or student health services at 905-688-5550 (ext. 3243). The research team is qualified to perform these tests, and are certified in first aid and CPR.

CONFIDENTIALITY

Any information that arises from participants will be confidential. Access to the data will be restricted to the principal investigator and co-investigator, and the principal student investigator. No identifying information will be associated with any data. Data collected during this study will be stored in the locked lab of Dr. Gabriel at Brock University and will be shredded three years following the completion of the study.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. To withdraw, simply inform the researchers that you no longer wish to participate. Further, you may decide to withdraw from this study at any time until all data has been collected, and may do so without any penalty or loss of benefits to which you are entitled. After this time, it will no longer be possible to withdraw, as your data will no longer be identifiable. If you withdraw, all the data you have completed to that point will be immediately destroyed.

PUBLICATION OF RESULTS

Results of this study may be published in professional journals and presented at conferences. Feedback about this study will be available. If you wish to receive a summary of the results, please complete the feedback request form provided by the researchers. You will receive a summary of the results by email (or regular mail if requested) within one month following completion of the study.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact the Principal Investigator using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University (File # 11-063). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

CONSENT FORM

I agree to participate in this study described above. I have made this decision based on the information I have read in the information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Thank you

Name: _____

Signature: _____ Date: _____

APPENDIX I

Brock University, Faculty of Applied Health Sciences
Debriefing Form

Title of Study: Self-Beliefs Concerning the One-Repetition Maximum Test: Chest Press and Leg Press.

Principal Investigator: Dr. Kimberley Gammage, Associate Professor, Department of Kinesiology, Brock University

Principal Student Investigator: Scott Crozier, M.Sc. Candidate, Faculty of Applied Health Sciences, Brock University

Co-investigator: Dr. David Gabriel, Professor, Department of Kinesiology, Brock University

Contact Information: sc06fw@brocku.ca, kgammage@brocku.ca, or dgabriel@brocku.ca

Thank you for participating in this study. In this particular study, we were examining the effects of trainer characteristics (specifically musculature and expertise) on one-repetition maximal performance and on self-presentational concerns such as self-presentational efficacy, social physique anxiety and state social anxiety. All participants completed the same protocol, only under the supervision and guidance of differing experimenters. One trainer was very muscular, and was described as a highly qualified and experienced trainer. The other trainer was leaner with significantly less muscle mass, and was described as a new, less experienced trainer. Research has indicated that we epitomize ideal physiques and those described as experts. It is believed that these environmental changes should increase bodily and self-presentational concerns among men. Therefore, in order to obtain a natural response, we could not reveal the true purpose of the study until afterwards. If you have any questions or comments regarding the study, feel free to contact Scott Crozier, Dr. Kimberley Gammage or Dr. David Gabriel at the above e-mail addresses. Thank you once again for your participation, and we ask you keep the true purpose of this study to yourself, so as to not compromise the results of future participants.

This project has been reviewed by, and received ethics clearance through the Office of Research Ethics Board (File# 11-063).

APPENDIX J

Brock University, Faculty of Applied Health Sciences
Summary of Results Request

Title of Study: Self-Beliefs Concerning the One-Repetition Maximum Test: Chest Press and Leg Press

Principal Investigator: Dr. Kimberley Gammage, Associate Professor, Department of Kinesiology, Brock University

Principal Student Investigator: Scott Crozier, M.Sc. Candidate, Faculty of Applied Health Sciences, Brock University

Co-investigator: Dr. David Gabriel, Professor, Department of Kinesiology, Brock University

If you would like to receive a summary of the results of the study, please complete the following information:

Name:

_____

E-mail Address:

_____

If you would like to receive the information by mail, please provide your name and address:

Name:

_____

(First) (Last)

Address:

_____

(Street Number) (Street)

_____

(City) (Province) (Postal Code)

APPENDIX K

Previous 1-RM Protocols

Source	**Why Incomplete for Novel Users?**
Headley, S. A., Henry, K., Nindl, B. C., Thompson, B. A., Kraemer, W. J., & Jones, M. T. (2011). Effects of lifting tempo on one repetition maximum and hormonal responses to a bench press protocol. *Journal of Strength and Conditioning Research, 25,* 406-413.	What weight to commence with if a predicted 1-RM value can't be reported? (No previous history in resistance training)
Levinger, I., Goodman, C., Hare, D. L., Jerums, G., Toia, D., & Selig, S. (2009). The reliability of the 1RM strength test for untrained middle-aged individuals. *Journal of Science and Medicine in Sport, 12,* 310-316.	What is 10 repetitions at a "relatively light load?" (With no predicted 1-RM value, it is difficult to assign warm-up weight values)
Saeterbakken, A. H., van den Tillaar, R., & Fimland, M. S. (2011). A comparison of muscle activity and 1-RM strength of three chest-press exercises with different stability requirements. *Journal of Sports Sciences, 29,* 533-538.	With inexperienced lifters, how can an accurate self-reported 1-RM be given?
Bellar, D. M., Muller, M. D., Barkley, J. E., Kim, C. H., Ida, K., Ryan, E. J., Bliss, M. V., Glickman, E. L. (2011). The effects of combined elastic- and free-weight tension vs. free- weight tension on one-repetition maximum strength in the bench press. *Journal of Strength and Conditioning Research, 25,* 459-463.	What weights were assigned to the initial 5 and 3 repetition sets? How was progression assessed to obtain one repetition value?
Feiefreisen, P., Vaillant, M., Eischen, D., & Delagardelle, C. (2010). Isokinetic versus one-repetition maximum strength	How do inexperienced weight lifters self-report an approximate 1-RM value? Maximal number of sets a 1-RM can be achieved?

assessment in chronic heart failure. *Medicine & Science in Sports and Exercise, 42*, 2156-2163.	
Spineti, J., de Salles, B. F., Rhea, M. R., Lavigne, D., Matta, T., Miranda, F., Fernandes, L., & Simao, R. (2010). Influence of exercise order on maximum strength and muscle volume in nonlinear periodized resistance training. *Journal of Strength and Conditioning Research, 24,* 2962-2969.	Limited 1-RM protocol description.
Lyons, T. S., McLester, J. R., Arnett, S. W., & Thoma, M. J. (2010). Specificity of training modalities on upper-body one repetition maximum performance: Free weights vs. hammer strength equipment. *Journal of Strength and Conditioning Research, 24*, 2984-2988.	How do inexperienced weight lifters self-report an approximate 1-RM value?
Rontu, J. P., Hannula, M. I., Leskinen, S., Linnamo, & V., Salmi, J. A. (2010). One-repetition maximum bench press performance estimated with a new accelerometer method. *Journal of Strength and Conditioning Research, 24,* 2018-2025.	How to warm-up effectively for this protocol? How do inexperienced weight lifters self-report an approximate 1-RM value?
Schwingel, P. A., Porto, Y. C., Dias, M. C., Moreira, M. M., & Zoppi, C. C. (2009). Predicting one repetition maximum equations accuracy in Paralympic rowers with motor disabilities. *Journal of Strength and Conditioning Research, 23*, 1045-1050.	How do inexperienced weight lifters self-report an approximate 1-RM value?
Schroeder, E. T., Wang, Y., Castaneda-Sceppa, C., & Cloutier, G. (2007). Reliability of maximal voluntary muscle strength and power testing in older men.	What values were used for low intensity warm-up? How do inexperienced weight lifters self-report an approximate 1-RM value?

The Journals of Gerontology, 62, 543.	
Chromiak, J. A., Smedley, B., Carpenter, W., Brown, R., Koh, Y. S., Lamberth, J. G., Joe, L. A., Abadie, B. R., & Altorfer, G. (2004). Effect of a 10-week strength training program and recovery drink on body composition, muscular strength and endurance, and anaerobic power and capacity. *Applied Nutritional Investigation, 2004*, 420-427.	How do inexperienced weight lifters self-report an approximate 1-RM value? Accurate predicted 1-RM values will eliminate 90 lb. increases between sets.
Rhea, M. R., Lander, D. M., Alvar, B. A., & Arent, H. M. (2003). The effects of competition and the presence of an audience on weight lifting performance. *Journal of Strength and Conditioning, 17*, 303-306.	What is a relatively light resistance?
Benton, M. J., Swan, P. D., & Peterson, M. D. (2009). Evaluation of multiple on repetition maximum strength trials in untrained women. *Journal of Strength and Conditioning, 23,* 1503-1507.	How to calculate the individuals estimated 1- RM?
Timson, B. F., Falls, H. B., Wilson, T. E., & Zimmerman, S. D. (2008). Effect of muscle strength on VO2 plateau occurrence rate. *Isokinetics and Exercise Sciences, 16*, 231-237.	Adequate warm-up? Is twice the subjects body weight an effective starting point?
Verdijk, L. B., van Loon, L., Meijer, K, & Savelberg, H. H. (2009). One-repetition maximum strength test represents a valid means to assess leg strength in vivo in humans. *Journal of Sports Sciences, 27,* 59-68.	Reliability assessed? How to complete in one trial?
Reiman, M. P., & Manske, R. C. (2009). Functional testing in human performance. pp. 141-150. Human	Estimated 1 RM for inexperienced weight lifters?

Kinetics, Windsor.	
Astorino, T. A., Rohmann, R. L., & Firth, K. (2008). Effect of caffeine ingestion on one-repetition maximum muscular strength. *European Journal of Applied Physiology, 102*, 127-132.	How was 43-61 kg load determined?
Wisloff, U., Castagna, C., Helgerud, J., Jones, R., & Hoff, J. (2004). Strong correlation of maximal squat strength with sprint performance and vertical jump height in elite soccer players. *British Journal of Sports Medicine, 38*, 285-288.	What was considered low weight for each individual and how was this value determined?
Cronin, J. B., & Henderson, M. E. (2004). Maximal strength and power assessment in novice weight trainers. *Journal of Strength and Conditioning Research, 18*, 48-52.	How was the starting point value determined?
Heyward, V. (2006). Advanced fitness assessment and exercise prescription: Fifth edition. Human Kinetics, Champaign, IL (pg. 122)	How was the estimated 1 RM value determined in inexperienced weight lifters?
Nieman, D. C. (2007). Exercise testing and prescription: A health related approach: Sixth edition. McGraw-Hill, New York (pg. 182).	Lack of detail to replicate protocol effectively.
Barnard, K. L., Adams, K. J., Swank, A. M., Mann, E., & Denny, D. M. (1999). Injuries and muscle soreness during the one repetition maximum assessment in a cardiac rehabilitation population. *Journal of Cardiopulmonary Rehabilitation, 19*, 52-58.	How to calculate perceived 1-RM?

APPENDIX L

ID # _____ Date: _____

Questionnaires:

Dem ____ PAR-Q ____ IM ____

Height: ____ cm

Weight: ____ lbs

Strength Training Free for 48 hrs (chest/legs): ____

Instructions: ____

5-Minute Warm-up (Treadmill): ____

Wathan Formula: 100*rep weight/ (48.8+53.8*exp [-0.075*reps])

Repetition Weight: _____lbs (for <10 repetitions)

# of Repetitions: _____

Wathan Formula:

_____

Predicted 1 RM Chest Press Value: _____lbs

3 Minute Rest ____

Wathan Formula: 100*rep weight/ (48.8+53.8*exp [-0.075*reps])

Repetition Weight: _____lbs (for <10 repetitions)

# of Repetitions: _____

Predicted 1 RM Leg Press Value: _____lbs

3 Minute Rest ____

Warm-up for Chest Press:

5-10 Repetitions at 40% of estimated 1 RM:

Repetition Weight: _____ lbs # of Repetitions Performed: _____

3 Minute Rest: ____

3-5 Repetitions at 70% of estimated 1 RM:

Repetition Weight: _____ lbs # of Repetitions Performed: _____

3 Minute Rest: ____

If 3 repetitions performed, increase to 90% of predicted 1 RM, 4 reps=95%, 5+ reps= 100%

1 RM Attempt # 1

Weight Attempted: _____lbs

1 RM Attempt # 2

Weight Attempted: _____lbs

1 RM Attempt # 3

Weight Attempted: _____lbs

1 RM Attempt # 4

Weight Attempted: _____lbs

1 RM Attempt # 5

Weight Attempted: _____lbs

1 RM Attempt # 6

Weight Attempted: _____lbs

1 RM Value Obtained (3-6 Sets): ____

1 RM Value: _____lbs

RPE Value: _____

Warm-up for Leg Press:

5-10 Repetitions at 40% of estimated 1 RM:

Repetition Weight: _____ lbs # of Repetitions Performed: _____

3 Minute Rest: ____

3-5 Repetitions at 70% of estimated 1 RM:

Repetition Weight: _____ lbs # of Repetitions Performed: _____

3 Minute Rest: ____

If 3 repetitions performed, increase to 90% of predicted 1 RM, 4 reps=95%, 5+ reps= 100%

1 RM Attempt # 1

Weight Attempted: _____lbs

1 RM Attempt # 2

Weight Attempted: _____lbs

1 RM Attempt # 3

Weight Attempted: _____lbs

1 RM Attempt # 4

Weight Attempted: _____lbs

1 RM Attempt # 5

Weight Attempted: _____lbs

1 RM Attempt # 6

Weight Attempted: _____lbs

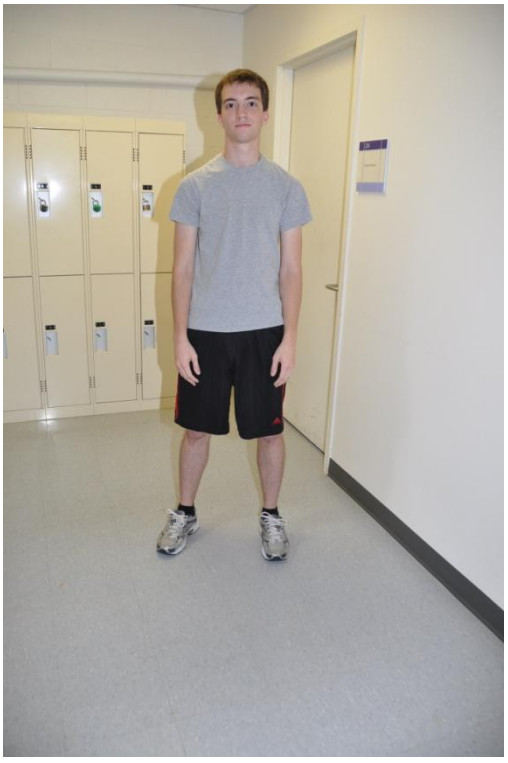
1 RM Value Obtained (3-6 Sets): ____

1 RM Value: _____lbs

RPE Value: _____

APPENDIX M

Lean, Novice Trainer



Muscular, Expert Trainer

APPENDIX N

Consistency Checklist

Introduce Yourself

Hi, my name is _____

I will be running you through the one-repetition maximum testing today _____

We need to get your height before starting _____

We now need to get your weight before you warm-up _____

Instructions

We will get your warmed-up on the treadmill for 5 minutes at 3.5 mph _____

Following this, we will get your predicted 1-RM values by using a submaximal test _____

I will show you the technique for the chest press _____

Keep feet on the ground ____ Butt, Back and Head on the Bench ____

With elbows in, push maximally until fully extending at your elbows and this is considered one repetition ____

Demonstrate _____

Now we must set the seat height for you _____

We must select a weight we think you can push less than 10 times, but closer to 1 _____

Based on response and knowledge, select a weight _____

Perform this weight as many times as you can, as you bring it down, the weights should almost come back down and touch and after a slight pause, return the weight to the extended position _____

Ok, go ahead _____

Count the repetitions _____

You're done with the chest press for now, and I will calculate your predicted one-repetition maximum for this machine _____

Now the same thing for leg press _____

We will get your predicted 1-RM values by using a submaximal test _____

I will show you the technique for the leg press _____

Keep feet shoulder width apart with a slight flare in the middle of the platform____ Butt, Back and Head on the Bench ____

Keeping your butt down, push maximally and fully extend your knees before slowly bringing the weight back down ____

Demonstrate _____

Now we must set the seat height for you _____

We must select a weight we think you can push less than 10 times, but closer to 1 _____

Based on response and knowledge, select a weight _____

Perform this weight as many times as you can, as you bring it down, the weights should almost come back down and touch and after a slight pause, return the weight to the extended position _____

Ok, go ahead _____

Count the repetitions _____

Between each set, we must take 3 minutes for recovery _____

We will now go for your actual 1-RM value _____

This is 40 % of your predicted 1-RM value, push this as many times as you can, stopping at 10 if you can get there _____

This is 70 % of your predicted 1-RM value, push this as many times as you can, stopping at 5 if you can get there _____

Now we will try for your 1-RM and will be taking 3 minutes between each set _____

Your one repetition maximum value is _____

Now the same thing for leg press _____

Between each set, we must take 3 minutes for recovery _____

We will now go for your actual 1-RM value _____

This is 40 % of your predicted 1-RM value, push this as many times as you can, stopping at 10 if you can get there _____

This is 70 % of your predicted 1-RM value, push this as many times as you can, stopping at 5 if you can get there _____

Now we will try for your 1-RM and will be taking 3 minutes between each set _____

Your one repetition maximum value is _____

The lifting section is complete, I will not get you to fill out a series of brief questionnaires and then you are done _____

Explain the feedback request form _____

Thank you for doing this study and have a good day _____

Final Score /**47**